AN ANALYSIS OF FINANCIAL PERFORMANCE OF STEEL AUTHORITY OF INDIA LTD., SINCE 2005

THESIS

SUBMITTED FOR THE AWARD OF THE DEGREE OF

Doctor of Philosophy
In
Commerce

BY

ASIF PERVEZ

UNDER THE SUPERVISION OF

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(ASSOCIATE PROFESSOR)

DEPARTMENT OF COMMERCE
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ALIGARH (INDIA)

2016

Dedicated

To My

Beloved Parents

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Asif Pervez

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LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance
ARTR	Account Receivable Turnover Ratio
ASP	Alloy Steel Plant
BC/BCE	Before Christ/Before Common Era
BF/BOF	Blast Furnace/Basic Oxygen Furnace
BLUE	Best linear unbiased estimators.
BSCL	Burn Standard Company Limited
BSE	Bombay Stock Exchange
BSL	Bhusan Steel Limited
BSL	Bokaro Steel Plant
BSP	Bhilai Steel Plant
C.I.S	Commonwealth of Independent States
CAPM	Capital Assets Pricing Model
CE	Capital Employed
CET	Centre for Engineering and Technology
CGR	Capital Gearing Ratio
CLRM	Classical Linear Regression Model
CMO	Central Marketing Organization
Co.	Company
CR	Current Ratio
CSR	Corporate Social Responsibility
CsR	Cash Ratio
DER	Debt to Equity Ratio
DPE	Department of Public Enterprises
DPR	Dividend Payout Ratio
DSP	Durgapur Steel Plant
EAF/IF	Electric Arc Furnace/Induction Furnace
EBIT	Earning Before Interest and Tax
EPS	Earnings Per Share
et. Al	et alia (and others)
Etc	Etcetera
ETR	Effective Tax Rate

EVA	Economic Value Added
FDI	Foreign Direct Investment
FSNL	Ferro Scrap Nigam Limited
FY	Financial Year
GDP	Gross Domestic Product
GOI	Government of India
GPR	Gross Profit Ratio
HSL	Hindustan Steel Limited
ICR	Interest Coverage Ratio
IIP	Index of Industrial Production
ISP	IISCO Steel Plant
ITD	International Trade Division
ITR	Inventory Turnover Ratio
ITR	Inventory Turnover Ratio
JISCO	Jindal Iron & Steel Company
Kg	Kilogram
KIOCL	Kudremukh Iron Ore Company Limited
KM	Kilometre
LR	Liquid Ratio
Ltd	Limited
M/s	Messers
MBR	Market To Book Value Ratio
MOS	Ministry of Steel
MOU	Memorandum of understanding
MSV	Model Steel Villages
MT	Million Tonnes
MTI	Management Training Institute
MVA	Market Value Added
MW	Megawatt
NACO	National AIDS Control Organization
NIBCLs	Non Interest Bearing Current Liabilities
NMDC	National Mineral Development Corporation
NOPAT	Net Operating Profit After Tax

NP	Net Profit
NPR	Net profit Ratio
NSE	National Stock Exchange
NSP	National Steel Policy
OER	Operating Expense Ratio
OLS	Ordinary Least Square
OPR	Operating Profit Ratio
P value	Probability Value
PC	Planning Commission
PER	Price Earnings Ratio
PSEs	Public Sector Enterprises
R & D	Research and Development
RDCIS	Research and Development Centre for Iron and Steel
RINL	Rashtriya Ispat Nigam Ltd.
ROA	Return on Assets
ROCE	Return on Capital Employed
ROE	Return on Equity
ROI	Return on Investment
ROW	Rest of the World
Rs.	Indian Rupees
RSP	Rourkela Steel Plant
SAIL	Steel Authority of India Limited
Sig.	Significance
SKIIPL	SAIL-Kobe Iron India Pvt. Ltd.
Sq.	Square
SR	Solvency Ratio
SRCL	SAIL Refractory Company Limited
SSP	Salem Steel Plant
Std. error	Standard Error
TATR	Total Assets Turnover Ratio
TISCO	Tata Iron & Steel Company Limited
USA	United States of America
VIF	Variance Inflation Factor

VISL	Visvesvaraya Iron and Steel Plant
WACC	Weighted Average Cost of Capital
WBIDC	West Bengal Industrial Development corporation
WSO	World Steel Organization
WTR	Working Capital Turnover Ratio

Chapter 1

Introductory Background of the Study

Chapter – 1

Introductory Background of the Study

1.0 INTRODUCTION

Business firms exist in a world of rapid changes. In 21st century, business and economic environment is characterized by various changes like High-growth markets, financial crisis, technological advances, stiff competition, innovation etc. (Garrad, 2013). In such a complex and rapidly changing corporate environment, a firm will not be able to survive in the long-run if its financial performance is not sound in all respects. A sound financial performance enables a firm to attain profitability, market share and sustainable competitive advantage for its survival and growth (Patra, 2009). Financial performance refers to a firm's ability to generate new resources from day to day operations over a given period of time. Financial performance evaluation is a process of determining the financial health of a concern from different angles, identifying its strengths and weaknesses and suggesting ways for improvement in its future workings (Patra, 2009). Financial performance measures evaluate how well a company is using its resources to make profit (Financial performance, n.d,). Earning profit is the ultimate objective of a firm. Every business entity aim to earn satisfactory return on the fund invested in it. Profit earning is necessary to meet various expenses occurring in the business. In the words of Keynes, (Cited in Gupta & Sharma, 2011) "Profit is the engine that drives the business enterprise". The efficiency of a business is measured by the amount of profit earned by it. The greater the profit, the more efficient the business will be. The profit of a business may be measured by studying the profitability of investment in it. All the activities in the business are the means and profit earning is the end. Therefore, an evaluation is done from time to time to assess the efficiency of operations and the profitability of the organization. This evaluation is called financial analysis or financial performance analysis. But profit maximization as an objective of a firm has been criticized by many scholars and is considered as traditional objective of the firm while wealth creation or value creation for the shareholders is considered as the modern objective of the firm (Khan & Jain, 2011). Therefore, another technique to assess the financial performance of an enterprise is value added technique which indicates the net value added or wealth created by the enterprise during a specific period. An enterprise may exist without making profit but cannot survive without adding value. The enterprise, not making profit, shall become sick but not adding value may cause its death over a period of time (Manickavasugi, 2011).

Keeping in view the above discussion, the financial performance measures can be divided into two major types (Joibary, 2013):

1. Profitability measures, which are traditional measures based on accounting/financial data like financial ratios (ROI, ROE, ROCE, EPS etc.) which reflect a firm's past performance, and
2. Wealth maximization or value maximization approaches like Economic Value Added (EVA) and Market Value Added (MVA) which are based on valuation principles and are advanced financial performance evaluation tools.

According to accountants' handbook by Wixon, Kell & Bedford (as cited in Sharma & Gupta, 2011), a ratio "is an expression of the quantitative relationship between two numbers". The relationship between two accounting figures, expressed mathematically, is known as a financial ratio (or simply as a ratio). The Ratio analysis is one of the most powerful tools of the financial analysis. It is used as a device to analyze and interpret the financial health of enterprise.

However, Traditional performance measures, sometimes unable to describe the Company's true business results and lead to wrong business decisions (Joibary, 2009). In conventional accounting, most companies may appear profitable but in fact they are not profitable. According to Peter Drucker (as cited in Shil, 2009), "Until a business returns a profit that is greater than its cost of capital, it operates at a loss. Never mind that it pays taxes as if it had a genuine profit. The enterprise still returns less to the economy than it devours in resources…until then it does not create wealth; it destroys it." The use of Market Value Added (MVA) and Economic Value Added (EVA) have been increasingly advocated as an advance on conventional performance measures which are based on accounting profits such as earnings per share (EPS), Return on capital employed (ROCE), or cash based measures such as Free Cash Flow (FCF) etc. (Zafiris & Bayldon, 1999). Therefore, changes have been made in the measurement of performance criteria of corporate entities, from the traditional profit based measures like EPS, ROCE, ROE etc., to the new value based performance measures like Market Value Added (MVA) and Economic Value Added (EVA) etc. Accounting often produces historical data or distorted data that may have no relation with the real status of the company, but EVA goes for adjustments to accounting data to make it economically viable (Shil, 2009).

Economic Value Added (EVA) is a new method of performance measurement. EVA is the amount of economic value added for the owners by management. According to Stern Stewart (as cited in Kim, 2006), EVA is the best and most practical performance measurement and well reflects the Company's real economic profit than any other method. The concept of the EVA is not new. Residual income is calculated by subtracting capital charges from operating profit. It can be said that EVA is one version of residual income with some adjustments. According to Wallace (as cited in Rompho, 2009), one of the earliest to mention the residual income concept was Alfred Marshall in 1890. Joibary (2009) believed that EVA is superior to accounting profits as a measure of value creation because it recognizes the cost of capital. Although, several studies found that EVA was not superior to other traditional performance measure but EVA has been continuously used and examined in various disciplines like finance and accounting, strategic management, marketing, and human resources.

In addition to EVA, another value added technique and modern performance measure is MVA. MVA measures the value created by a company by deducting from the current market value of its capital (equity and debentures), the funds invested in the company valued at the time of such investment (Zafiris & Bayldon, 1999). According to Milunovich & Tsueias (as cited in Kim, 2006), Market value added (MVA) is equal to the present value of the firm’s expected future EVA. MVA shows whether a firm has added value to the capital it has obtained from shareholders and lenders. According to Kim et al (as cited in Joibary, 2009), a positive EVA year after year will increase its MVA, since MVA is the present value of the firm's expected future EVAs. MVA is basically the present value of all the EVA that a Company is expected to generate in future. An organization can maximize its MVA by maximizing its EVA. Studies have shown that, compared to other accounting measures, MVA has the best correlation with Economic Value Added (EVA).

1.0.1 Public Sector Enterprises in India

At the time of independence, India was a backward, underdeveloped and agrarian economy with weak industrial base, high rate of unemployment and low level of savings and investment. At that time, rapid industrialization was believed as the key of economic development and sovereignty of the country. But because of the lack of funds and long gestation period of investment, private sector was not able to take the risk. Therefore, role of government investment was necessary to overcome economic and social backwardness of the country. India's Industrial Policy evolved through successive Industrial Policy Resolutions and Statements which paved the way for the Industrial Policy Resolution of 1956. The resolution was based on Mahalanobis model of growth, which emphasized the need of heavy industries to lead the economy towards a long term higher growth path. Therefore, the Resolution widened the scope of public sector (Jadhav, n.d). Consequently, the planning process (Five year Plans) was initiated taking into account the needs of the country. The new strategies for the public sector were later outlined in the policy statements in the years 1973, 1977, 1980 and 1991 (Department of Public Enterprises, 2006).

From 1951 to 1991, India followed a centralized economic planning with extensive regulatory controls over the economy. The strategy was based on an ‘inward-looking import substitution’ model of development. In 1991, country faced severe economic crises due to oil price shock, fall of Soviet Union and depletion of foreign exchange reserve etc. But this economic crises was converted into an opportunity to effect some fundamental changes in the economic policy of the country which led the country to implement a number of policy reforms including sharp cuts in tariff and non-tariff barriers, liberalization of FDI rules, exchange rate & banking reforms and a significant reduction in the GOI’s control over private sector investment etc. These changes are known as new industrial policy 1991 (Ghouse et al., 2013).

In the new industrial policy announced in July, 1991 iron and steel industry, among others, was removed from the list of industries reserved for the public sector and also exempted from the provisions of compulsory licensing under the Industries (Development and Regulation) Act, 1951. Pricing and distribution of steel were deregulated from January, 1992 (Ministry of Steel, 2006). Nearly a century old iron & steel industry was the first core sector to be completely free from licensing requirement, pricing control and distribution control (Corporate catalyst, 2015). A brief introduction of Indian steel Industry and a brief profile of SAIL have been discussed as follows.

1.0.2 Indian Steel Industry

The Indian steel industry is one of the most important industries in India. It marks its beginning with the first integrated steel plant established by Tata Iron & Steel (popularly known as Tata Steel) in 1907. Integration of steel industry with other important industries like infrastructure, construction, automobile etc., makes it a strategic sector for the economy as huge demand for steel is derived from these sectors (Department of Public enterprises, 2006).Indian has been fourth largest steel producing country in the world in the year 2014-15 with the production of 91.46 million tonnes (MT) of finished steel, a growth of 4.3% over 2013-14 (MOS, 2015) and is expected to become the second-largest producer by 2016 (Indian Brand Equity Foundation, 2016). Indian steel sector has the advantage of raw materials and cost-effective labour. The steel sector in India contributes nearly two per cent of the country's gross domestic product (GDP) and employs over 6,00,000 people. The per capita consumption of total finished steel in the country has risen from 51 Kg in 2009-10 to about 59 Kg in 2014-15 (Indian Brand Equity Foundation, 2016). With improving economic activities, India's steel consumption for FY 2015-16 is estimated to increase by 7 per cent, a growth of 2 per cent from the last year (Ernst & Young, 2015).

The National Steel Policy 2005 envisaged steel production to reach 110 million tonnes (MT) by 2019-20 (Ministry of Steel, 2005). But the Working Group on Steel for the 12th Five Year Plan has projected that domestic crude steel capacity in the county is likely to be 140 MT by 2016-17 and has the potential to reach 149 MT if all requirements are adequately met (Ministry of Steel, 2011). Furthermore, the National Steel Policy 2005 is currently being reviewed in the light of the rapid developments in the domestic steel industry as well as the stable growth of the Indian economy since the release of the Policy in 2005 (Ministry of Steel, 2015). India is expected to become the world's second largest producer of crude steel from fourth largest producer in next ten years, as the production capacity of steel in India is projected to become 300 MT by 2025 with expected rise in consumption of steel due to increased infrastructure construction and the thriving automobile and railways sectors (Indian Brand Equity Foundation, 2016).

1.0.3 A brief profile of Steel Authority of India Limited (SAIL)

Steel Authority of India Limited (SAIL) is one of the largest public sector steel making company based in New Delhi, India. It is India's largest steel producing company and one of the top steel makers in world with an annual turnover of Rs. 50,627 crores in the year 2014-15 (SAIL, n.d.). SAIL has five integrated steel plants, three special plants, and one subsidiary in different parts of the country.

SAIL traces its origin to the Hindustan Steel Limited (HSL) which was set up on 19 January 1954. HSL was set up after the independence to develop the infrastructure for rapid industrialization of the country. The Ministry of Steel and Mines drafted a policy statement to evolve a new model for managing industry which was presented to the Parliament on December 2, 1972 to create a holding company. As a result, Steel Authority of India Ltd. was incorporated on January 24, 1973 with an authorized capital of Rs. 2000 crores. It was made responsible for managing five integrated steel plants at Bhilai, Bokaro, Durgapur, Rourkela and Burnpur, along with the Alloy Steel Plant and the Salem Steel Plant. In 1978 SAIL was restructured as an operating company.

Since its inception, SAIL has been instrumental in laying a sound infrastructure for the industrial development of the country. Besides, it has immensely contributed to the development of technical and managerial expertise. It has triggered the secondary and tertiary waves of economic growth by continuously providing the inputs for the consuming industry.

The present study has been conducted to evaluate financial performance of Steel Authority of India Limited, which is a public sector enterprise in Indian steel Industry and largest steel producer in India. In the present study both, traditional performance measures (ROCE & ROA) as well as advanced performance measures (EVA & MVA), have been used to analyze the financial performance of Steel authority of India Limited, since the financial year 2005-06.

1.1 STATEMENT OF THE PROBLEM

Steel is considered as the backbone of human civilization. It is important for the development of any modern economy. Significance of steel for an economy can be understood by the fact that the level of per capita consumption of steel is considered as an important indicator of the level of socioeconomic development and living standards of the people in the country. Some companies in Indian steel industry are known for their phenomenal growth such as Jindal steel, TISCO and Steel authority of India Limited. Currently, the domestic steel industry is facing new challenges related to huge capital investment**,** Shortage of metallurgical coal, Inferior quality of products, Lack of Technology, Low Productivity and Inefficiency of public sector units. Most of the public sector units are overwhelmed by inefficiency caused by heavy investment on social overheads, poor labour relations, inefficient management, underutilization of capacity, etc. This hinders proper functioning of the steel plants especially with increasing competition and limited resources in the present world of liberalized economy. The survival, growth and organizational success of a business enterprises is greatly depend on the efficient management of its finance. In recent time, a number of financial problems are faced by public sector enterprises (PSEs) which require analytical studies related to their financial performance. The main purpose of the present study is to look into the operational activities and financial efficiency of steel manufacturing and trading sector of India with special reference to Steel Authority of India Limited. The present study is a doctoral thesis entitled, "AN ANALYSIS OF FINANCIAL PERFORMANCE OF STEEL AUTHORITY OF INDIA LTD., SINCE 2005" which has been undertaken with a view to highlight the importance of an efficient financial management in a public sector steel company SAIL. Analytical study of financial performance is important for financial managers to analyze various financial aspects. Analysis of financial statement can highlight the strength and weaknesses of the company. This information can be used by management to improve performances and to predict future results.

1.2 SCOPE OF THE STUDY

The study covers overall financial performance of Steel Authority of India Limited during the period under study. Financial area is the coverage of the study. Therefore, the study is focused on financial performance of SAIL during the study period where analysis of financial statements of the company has been taken into account. The study covers different aspects of financial performance of Steel Authority of India Limited. It includes analysis of profitability, liquidity, solvency, management efficiency, market valuation and value creation by the company under study. The issues relating to different non-financial aspects of performance like work environment, business strategy, organizational culture, and other operational, social and environmental practices have been excluded from the core area of this research study. The study also provides empirical evidence on Economic Value Added (EVA) and Market Value Added (MVA) as tools of value creation. The study investigates relationship between Economic Value Added (EVA), Market Value Added (MVA) and financial ratios of the company. The study assesses financial strength of SAIL with the help of comparison of Company's financial ratios with industry average ratios.

1.3 SIGNIFICANCE OF THE STUDY

In a business entity, profit earning is the ultimate objective among others. A business cannot survive in the long run without earning any profit. A business entity earns profit to meet various expenses like wages & salary of workers, maintenance of machinery and buildings, paying interest to its creditors, to provide return to the owner of the business etc. In the words of Keynes, "Profit is the engine that drives the business enterprise" (Keynes, quoted by Gupta and Sharma: 2011). Financial performance analysis aims at examining whether or not a business entity has fulfilled its objectives. Financial performance is ultimately reflected by the profitability and value creation, which depend upon the efficient management of resources available with the business entity. Thus financial analysis covers vast area of working capital management, leverage management, assets management etc. Various stakeholders like shareholders, management, workers, government, lenders, potential investors, financial institution, banks etc. are interested in financial position of the concern business entity. Financial performance evaluation helps them in determining true financial position of the concern business entity from their perspectives. Thus, evaluation of financial performance is of great importance to all the concerned as it helps in Judging the operational efficiency of the business, evaluating Return on

Investment, Assessing the growth potential of the business, Intra firm and inter firm comparison of the performance, Forecasting, budgeting and deciding future line of action and Pinpoints strengths and weakness (Sharma & Gupta, 2011).

The present study aims to analyze the financial performance of Steel Authority of India Limited, which is a Public Sector Enterprise and India's largest steel producing company. It had a turnover of Rs. 50,627 crores in the year 2014-15, Also the company is among the seven *Maharatnas* of the country's Central Public Sector Enterprises (SAIL, n.d.).

Steel is an indispensable requirement for various infrastructural development of our Country. In fact, iron & steel industry in any country provides the basis for its economic development. In this context, evaluation of financial performance of the largest steel making company in India is highly significant. The study is expected to help the management of the company, the financiers of the company, the potential investors of the company and the government at large, to take valuable decisions at their own. The present study would also provide insight to banks, financial institutions and long-term lenders to understand the financial capability and effectiveness of the company.

1.4 OBJECTIVES OF THE STUDY

The main objective of the present research is to evaluate the financial Performance of Steel Authority of India Limited. Present study seeks to examine the changes that have occurred in SAIL over a period of ten years from 2005-06 to 2014-15. The Main objective of the study has been supported by the following specific objectives:

1. To analyse the financial position of SAIL with respect to liquidity, solvency, management efficiency, profitability, market valuation and value addition.
2. To assess the impact of liquidity, solvency and management efficiency on traditional performance measures of SAIL.
3. To investigate the impact of liquidity, solvency and management efficiency on advance performance measures of SAIL.
4. To examine the relationship of traditional and advance performance measures with Market Value Added (MVA) of SAIL.

5. To examine the relation between Economic Value added and traditional performance measures of SAIL.
6. To assess financial strength of SAIL with the help of comparison of Company's ratios with industry average ratios.
7. To summarise the main findings of the study and to offer suggestions, if any, for improving the performance of the company under study.

1.5 HYPOTHESES OF THE STUDY

For studying the above objectives, the following null hypotheses have been framed. The proposed hypotheses have been framed in the light of prior theoretical and empirical literature.

Hypotheses of the study (Multiple Linear Regression analysis)

$H0_1$: There is no significant impact of Liquidity on Financial performance of SAIL.

$H0_{1a}$: There is no significant impact of Current Ratio on Return on Capital Employed.

$H0_{1b}$: There is no significant impact of Current Ratio on Return on Assets.

$H0_{1c}$: There is no significant impact of Current Ratio on Economic Value Added.

$H0_2$: There is no significant impact of Solvency on Financial performance of SAIL.

$H0_{2a}$: There is no significant impact of Debt to Equity ratio on Return on Capital Employed.

$H0_{2b}$: There is no significant impact of Debt to Equity ratio on Return on Assets.

$H0_{2c}$: There is no significant impact of Debt to Equity ratio on Economic Value Added.

$H0_3$: There is no significant impact of Management Efficiency on Financial performance of SAIL.

$H0_{3a}$: There is no significant impact of Inventory Turnover ratio on Return on Capital Employed.

$H0_{3b}$: There is no significant impact of Inventory Turnover ratio on Return on Assets.

$H0_{3c}$: There is no significant impact of Inventory Turnover ratio on Economic Value Added.

$H0_4$: There is no significant impact of financial performance measures on Market Value Added of SAIL.

$H0_{4a}$: There is no significant impact of Return on Capital Employed on Market Value Added.

$H0_{4b}$: There is no significant impact of Market to book Value ratio on Market Value Added.

$H0_{4c}$: There is no significant impact of Economic Value Added on Market Value Added.

Hypotheses of the study (Correlation analysis)

$H0_5$: There is no significant relation between traditional performance measures and Economic Value added of SAIL.

$H0_{5a}$: There is no significant relation between Return on Capital Employed and Economic Value Added.

$H0_{5b}$: There is no significant relation between Return on assets and Economic Value Added.

$H0_{5c}$: There is no significant relation between Return on Equity and Economic Value Added.

$H0_{5d}$: There is no significant relation between Earnings per share and Economic Value Added.

Hypotheses of the study (One sample t-test)

$H0_6$: There is no significant difference between Profitability of SAIL and industry average profitability.

$H0_{6a}$: There is no significant difference between Return on Assets of SAIL and its industry average.

$H0_{6b}$: There is no significant difference between Return on Equity of SAIL and its industry average.

$H0_7$: There is no significant difference between Liquidity of SAIL and industry average Liquidity.

$H0_{7a}$: There is no significant difference between Current ratio of SAIL and its industry average.

$H0_{7b}$: There is no significant difference between Liquid ratio of SAIL and its industry average.

$H0_8$: There is no significant difference between Solvency of SAIL and industry average Solvency.

$H0_{8a}$: There is no significant difference between Debt to Equity ratio of SAIL and its industry average.

$H0_{8b}$: There is no significant difference between interest coverage ratio of SAIL and its industry average.

$H0_9$: There is no significant difference between Management Efficiency of SAIL and industry average Management Efficiency.

$H0_{9a}$: There is no significant difference between total assets turnover of SAIL and its industry average.

$H0_{9b}$: There is no significant difference between working capital turnover ratio of SAIL and its industry average.

1.6 RESEARCH METHODOLOGY OF THE STUDY

This part of the chapter discusses methodology adopted in collection and analysis of data for the present study. It briefly explains the sources of data, the techniques followed in analyzing the data and the period of study. Further, the variable used in the study and limitations of the study have also been dealt herein. The present study is a case study of Steel Authority of India Limited which is a public sector enterprise and largest steel manufacturing company in India.

1.6.1 Research design

Analytical research design has been used in the present study where available facts and information have been used to analyze and to make critical evaluation of financial position of SAIL.

1.6.2 Nature and sources of data

The data pertaining to the present study were collected from the secondary sources only. Three types of data were used in the present study: financial data of SAIL, historical data related to Steel industry and macro-economic data. Financial data of SAIL were collected from various published annual reports and financial statements of SAIL extracted from the official website of the company, official websites of Bombay Stock Exchange (B.S.E) and National Stock Exchange (N.S.E). The historical information relating to the Steel industry was extracted from the relevant published documents of the Ministry of Steel (GOI), World steel association & other documents available in the public domain. The data on macro-economic variables were obtained from RBI, BSE, NSE and other Government websites of India. Besides these sources, data have also been extracted from Ace Equity and Indiastat databases. Furthermore, research reports of the various contributors on the subject matter, articles in various journals, magazines, newspapers and other published literature on the subject have been screened to gather required information for the study.

1.6.3 Period of the study

The present study covers a period of ten years from 2005-06 to 2014-15. The ten year period has been chosen in order to have a fairly long and cyclically well balanced period, for which reasonably homogeneous, reliable and up-to-date financial data were available.

1.6.4 Variables used in the study

The variables incorporated in the present study are divided into two categories: Financial ratios and value added measures. Financial ratios were used in the present study to analyze the financial performance of Steel Authority of India Limited. Financial ratio analysis is an important and powerful technique of financial performance evaluation. Therefore, various financial ratios under the categories of liquidity, profitability, management efficiency, solvency and market valuation have been calculated and analyzed. Along with the traditional technique of financial ratio analysis, advanced value addition techniques in the form of Economic Value added (EVA) and Market value Added (MVA), have been used to analyze the financial performance of SAIL during the study period. The concept of ratio analysis, along with the concept Value Addition measures, has been discussed in detail in the fourth chapter of the thesis. In the present study, the selection of variables was based on their popularity in literature, performance of such ratios in earlier studies and their relevance for the present study. The dependent and independent variables used in Ordinary Least Square (OLS) models along with their proxy measures used in the study and their evidences in literature are given in the following table 1.1.

Table 1.1: Proxy measures of Dependent & Independent Variables in OLS models

Model	Variable	Proxy measures	Evidences
1.	Profitability (Dependent)	Return on Capital Employed (ROCE)	Pal (2013), Takeh & Navaprabha (2015), Bhunia and Brahma (2009), Pratheepkanth (2011),Chandrashekaran, Manimannan, and Priya (2013)
	Liquidity (Independent)	Current Ratio (CR)	Arab, Masoumi, & Barati (2015), Singla (2013), Bhunia and Brahma (2009), Owolobi, Obiakor, and Okwu (2011), Sharma (2010), Afeef (2011), Sandhar and Janglani (2013), Sivathaasan et. al. (2013)
	Solvency (Independent)	Debt to Equity Ratio (DER)	Arab, Masoumi, & Barati (2015), Pratheepkanth (2011), Sivathaasan et. al. (2013)
	Efficiency (Independent)	Inventory turnover Ratio (ITR)	Arab, Masoumi, & Barati (2015)
2.	Profitability (Dependent)	Return on Assets (ROA)	Pal (2013), Pratheepkanth (2011), Sharma (2010), Afeef (2011), Sandhar and Janglani (2013), Agha (2014), Sivathaasan et. al. (2013)
	Liquidity (Independent)	Current Ratio (CR)	Bhunia and Brahma (2009), Owolobi, Obiakor, and Okwu (2011), Sharma (2010), Afeef (2011), Sandhar and Janglani (2013), Agha (2014), Sivathaasan et. al. (2013)
	Solvency (Independent)	Debt to Equity Ratio (DER)	Pratheepkanth (2011), Sivathaasan et. al. (2013)
	Efficiency (Independent)	Inventory turnover Ratio (ITR)	Arab, Masoumi, & Barati (2015)
3.	Economic Value Added (Dependent)	EVA	Sharma & Grover (2015), Irala (2007),

	Liquidity (Independent)	Current Ratio (CR)	Sharma (2010), Sandhar and Janglani (2013), Agha (2014), Sivathaasan et. al. (2013)
	Solvency (Independent)	Debt to Equity Ratio (DER)	Sharma & Grover (2015), Pratheepkanth (2011), Sivathaasan et. al. (2013)
	Efficiency (Independent)	Inventory turnover Ratio (ITR)	Arab, Masoumi, & Barati (2015)
4.	Market Value Added (Dependent)	MVA	Sharma & Kumar (2012), Prasad & Shrimal (2015), Aslam et. al. (2015), Hall (2013), Irala (2007),
	Profitability (Independent)	Return on Capital Employed (ROCE)	Sharma & Kumar (2012), Prasad & Shrimal (2015), Aslam et. al. (2015), Hall (2013), Irala (2007),
	Economic Value Added (Independent)	EVA	Sharma & Kumar (2012), Aslam et. al. (2015), Hall (2013), Irala (2007),
	Market Valuation (Independent)	Market to Book Value Ratio (MBR)	Prasad & Shrimal (2015), Irala (2007),

Source: *Compiled from various studies*

1.6.5 Tools & techniques for analysis

For analyzing the data, statistical techniques like measure of central tendency, measures of dispersion, Pearson correlation analysis, multiple regression analysis, t test etc., have been used and hypotheses have been tested at confidence level of 95%.

The present study employed a multi-regression technique to analyze the impact of liquidity, solvency and management efficiency (explanatory variables) on profitability (explained variable) of SAIL. This technique has been widely used in prior empirical studies (Pal, 2013; Singla, 2013; Bhunia and Brahma, 2009; Pratheepkanth, 2011) to investigate the influence of financial ratios on profitability. Multiple linear regression analysis has been conducted to analyze the impact of Liquidity, solvency and management efficiency on Economic Value Added (EVA) of SAIL. Multiple linear regression analysis was conducted to analyze the impact of traditional performance measures (Profitability and market valuation) and advanced performance measures (EVA) on Market value Added (MVA) of SAIL. Correlation technique, which is complementary to regression analysis, was used to test the relationship between the Economic value added and traditional performance measures and to check for the multicollinearity problem in OLS models. In addition, one sample *t*-test was conducted to analyze if there was any significance difference between financial ratios of SAIL and their Industry averages during the study period. Industry average financial ratios have been used as benchmark ratios in the study. Furthermore, t-test has been conducted to analyze the significance of regression coefficients and *F*-test was used to test the overall significance of the estimated regression coefficients and to test the significance of R^2. All these statistical techniques that have been used for the financial performance analysis of Steel Authority of India Limited are discussed below:

1.6.5.1 Descriptive statistics

The term "descriptive statistics" means the analysis of data that helps to describe or summarize data in a meaningful way. A simply presented data is hard to visual therefore, descriptive statistics are very important as it present the data in a more meaningful way which allows simple interpretation of the data ("Descriptive", n.d.). Descriptive statistics provide a concise summary of data where data can be summarized numerically or graphically ("What are descriptive", n.d). Typically, there are two general types of statistic that are used to describe data: Measure of Central tendency and measure of dispersion.

- ***Measures of Central Tendency***

The measure of central tendency is the method of finding out the central values or average value of a statistical series or any series of quantitative information. Measures of central tendency are also known as statistical averages. The measure of central tendency contains measure characteristics which represents the whole series. The main objective is to give a brief picture of a large group and to give a basis of comparison with other groups. There are various types of statistical averages like Arithmetic mean, median, mode, geometric mean and harmonic mean etc. Mean, also known as arithmetic average, is the most common measure of central tendency. It is defined as the value which obtained by dividing the total of the values of various given items in a series by the total number of items. It is calculated as:

$$Mean(X) = \frac{X1 + X2 + ... + Xn}{n}$$

- ***Measures of Dispersion***

Average is the central value which represents the entire series but it fails to give any idea about the scatteredness of the values around average value. In order to measure this scatteredness, measures of dispersion is calculated. Measures of dispersion, indicates the extent to which the individual values fall away from the average or the central value. Range, mean deviation and standard deviation are the important measures of dispersion. These measures can be stated in two ways: Absolute and Relative. Under the absolute method, the dispersions are found out in the same unit in which the data are expressed. But this method of dispersion is not suitable for comparative study of the character of two or more series. The relative dispersions are expressed in terms of ratios, or percentage and these are represented as co-efficient of dispersion. Relative dispersion can be used for comparison.

1.6.5.2 Correlation analysis

Correlation is a statistical technique which measures degree and direction of relationship between the variables. Two variables are said to be correlated if with a change in the value of one variable, there arises a change in the value of another variable. It always lies between ±1. It is a relative measure. The primary objective of correlation is to measure the strength or degree of linear association between two variables where correlation coefficient measure this strength (Gujrati, Porter & Gunasekar, 2012).

1.6.5.3 Regression Analysis

Regression is a statistical approach to forecast the change in a dependent variable on the basis of change in one or more independent variables. Regression is an attempt to explain movements in a variable by reference to movements in one or more other variables (Brooks, 2014). A regression analysis equation can be used in fitting a curve or line to data points, in a manner such that the differences in the distances of data points from the curve or line are minimized (“Regression”, n.d.). In Regression we try to estimate or predict the average value of one variable on the basis of the fixed values of other variables (Gujrati, et. al., 2012).

1.6.5.4 One sample t-test

One sample *t*-test is a statistical procedure used to examine the mean difference between the sample and the known value of the population mean. In one sample t-test, the population mean is known. A random sample is drawn from the population and compared with the population mean to make a statistical decision as to whether or not the sample mean is different from the population mean. It is calculated as:

$$t = \frac{\overline{X} - \mu}{S\sqrt{n}}$$

Where, t = the test statistic, $\overline{X}$= the mean of a small sample, μ= the actual or hypothetical mean of population, S= the standard deviation of the sample& n= Sample size

The hypothesis is Rejected if t > Table value and Accepted if t ≤ Table value.

1.6.5.5 Diagrams & Graphs

Diagrams and graphs are visual aids, which give a bird’s eye view of a given set of numerical data. They present the data in simple, readily, comprehensible and intelligible form. Graphical presentation of statistical data gives a pictorial effect instead of just a mass of figures. They depict more information than the data shown in the table which throws light on the existing trend and changes in the trend of the data.

Analysis of huge volume of data collected from the said sources has been done by using a personal computer. Microsoft Excel package has been used for computation of different ratios. E-views-7 software has been used to generate the results. Before running regression models, pre-testing procedure was conducted to ensure the fulfillment of required assumptions of multiple regression technique and to have OLS estimators as BLUE i.e. best linear unbiased estimators.

1.6. 6 Assumptions of Classical Linear Regression Model

Following are the important assumptions that needed to be fulfilled while using Multiple Linear regression analysis (Gujrati, et al., 2012 & Brooks, 2014).

1.6.6.1 Normality assumption

The assumption of normality of residual should hold to draw accurate and reliable conclusions as it leads to unbiased estimates of coefficients and standard errors. There are various methods through which we can calculate normality of data, for example, skewness and Kurtosis statistics, Shapiro-Wilks test, Kolmogolov-Smirnov test, histogram, normal Q-Q plot, P-P plot, and Box Plot, etc.

The present study uses graphical tool (P-P plot) to check whether the residuals are normally distributed. The graphical tools are better than other normality tests like Shapiro-Wilks test and Kolmogolov-Smirnov test because it shows pictorial representation of data by which the exact shape of distribution can be seen. Moreover, Kolmogolov-Smirnov test cannot be considered reliable in case sample size is less 2000 while as Shapiro-Wilks test cannot be considered reliable when sample size exceeds 2000 limit. If the data is not normal, the data can be transformed with the help of different transformation techniques like logarithms, square roots, reciprocals, arcsine, power transform etc. Different transformation techniques work for different types of data, for example, square root transformation best suits polynomial data, arcsine is useful for percentages and proportions while log transformation best works for exponential data etc.

1.6.6.2 Multicollinearity assumption

An important assumption made when using the OLS estimation method is that the explanatory variables are not correlated with one another. If there is no relationship between the explanatory variables, they would said to be *orthogonal* to one another (Brooks, 2014). Multicollinearity is a statistical phenomenon in which two or more predictor variables in a multiple regression model are highly correlated. Brooks (2014) also stated that a small degree of association between explanatory variables will almost always occur but will not cause too much loss of precision. However, a problem occurs when the explanatory variables are very highly correlated with each other, and this problem is known as multicollinearity.

In the presence of multicollinearity problem, the regression model would have high R square and highly significant F statistic, but there would be either very few or no significant t-statistics on the individual coefficients. The regression becomes very sensitive to small changes in the data (Gujrati et al., 2012). Near multicollinearity make the confidence intervals for the parameters very wide, and significance tests might therefore, give inappropriate conclusions (Brooks, 2014). It is therefore important to diagnose and mitigate the problem of multicollinearity so that the precision of results may increase.

- **Detection of Multicollinearity**

Various approaches used in research studies to detect multicollinearity are High R square, high pair wise correlation among regressors, partial correlation, scatter plots, Eigen values, condition index, tolerance and Variance inflation factor (Gujrati et al., 2012). But in the present study Pearson correlation coefficients and Variance inflation factor have been used to detect the problem of multicollinearity. Pearson correlation coefficients denoted by ‘r’, show the correlation between independent variables, which are subject to co-linearity problems in regression analysis. As a rule of thumb if pair wise correlation coefficient between two regressors is high (more than 0.8) then multicollinearity is a serious problem (Gujrati et al., 2012).

Variance inflation factor is also widely used to detect the problem of multicollinearity. It provides an index that measures how much variance of estimated regression coefficients is inflated because of linear dependence with other predictors if the predictors are correlated. The VIF is calculated as: 1 divide by 1-Rsquare, where R square is the coefficient of determination. As a rule of thumb, VIF greater than 10 indicates the presence of harmful multicollinearity.

- **Solutions to Multicollinearity problem**

A number of alternative estimation techniques have been proposed that are valid in the presence of multicollinearity, for example, ridge regression, or principal components. But multicollinearity is more a problem with data. Various methods for dealing with the possible existence of multicollinearity are as follows (Brooks, 2014, Gujrati et al., 2012).

- **Ignore multicollinearity**

Multicollinearity can be ignored if the model is statistically adequate and each coefficient has a plausible magnitude and an appropriate sign. The presence of near multicollinearity does not affect the BLUE properties of the OLS estimator since the presence of near multicollinearity does not violate any of the CLRM assumptions (Brooks, 2014). However, the problem will persist if the predictor variable does not follow the same pattern of multicollinearity and also in most cases it makes most of the beta coefficient of the variables insignificant (Gujrati et al., 2012).

- **Dropping of few highly correlated variables**

One of the simplest things to deal with multicollinearity is to drop one of the collinear variables (Gujrati et al., 2012). Removal of highly correlated predictors can produce a model with significant coefficients because they sometimes supply redundant information. However, omissions of relevant variables may result in Specification bias from incorrect specification of model (Gujrati et al., 2012).

- **Transform of Data**

Multicollinearity can be dealt by transformation of the highly correlated variables into a ratio and include only the ratio and not the individual variables in the regression. But this may be unacceptable if financial theory suggests that changes in the dependent variable should occur following changes in the individual explanatory variables and not a ratio of them (Brooks, 2014).

- **Addition of New data**

Another way to reduce multicollinearity is to increase the size of sample. However, the problem will arise when the sample size is limited and restricted.

- **Use of stepwise-regression method**

Use of stepwise-regression method automatically remove the highly correlated predictors from the model and does not report such variables in output window. The removal of highly correlated factors usually does not reduce the estimated power of R squared (Martz, 2013). However, omissions of relevant variables may result in Specification bias from incorrect specification of model.

- **Use of partial least square regression or Principal components analysis regression methods**

These methods reduce the number of predictors to a smaller set of uncorrelated components. These techniques disintegrate the combined relationship of highly correlated variables and create new principal components/variables by retaining maximum variations, thus reducing the multicollinearity problem (Martz, 2013).

- **Standardization of the variables**

A standardize variable or Z score or a standard score, is a variable that has been rescaled to have a mean of zero or a standard deviation of one. This method can level down the multicollinearity to a considerable level. This technique has been widely used in empirical studies. The rationale is that no information is lost as a result of this standardization. The original metric can always be recovered when the mean and the standard deviation of the original variable are given.

1.6.6.3 Autocorrelation/serial-correlation assumption

In linear regression analysis, it is assumed that the errors are uncorrelated with one another. If the errors are not uncorrelated with one another, it would be stated that they are autocorrelated or serially correlated (Brooks, 2014). This assumption implies that the residuals are not serially correlated from one observation to the other. The presence of autocorrelation of the error terms violates the ordinary least squares (OLS) assumption that the error terms are uncorrelated. As a result of autocorrelation problem in the model, the R^2 will be overestimated and the usual *t*, *F*, and R^2 may not be valid (Gujrati et at., 2012). The OLS estimations in the presence of autocorrelation are likely to produce misleading results about the statistical significance of the estimated regression coefficients. Therefore, a test of this assumption is required.

- **Detection& Solution of Autocorrelation**

The problem of autocorrelation can be detected with the help of various techniques like graphical method, where visual examination of plots of residual can help in detecting the autocorrelation. To detect autocorrelation with the help of graphs, the residual can be plotted against time (Time sequence plot), alternatively standardized residuals can be plotted against time (Gujrati et al., 2012). However, Graphical methods may be difficult to interpret in practice and Therefore, a formal statistical test should also be applied (Brooks, 2014). The simplest test for detecting serial correlation is Durbin Watson t statistic which is simply a ratio of the sum of squared differences in successive residuals to the RSS (Gujrati et at., 2013).

In the present study, Durbin Watson test has been used to test the presence of serial correlation among residual in time series data, Durbin-Watson test has been used under the null hypothesis that the errors are serially uncorrelated against the alternative that they follow a first order autoregressive process The Durbin-Watson statistic is always between 0 and 4. As a rule of thumb, a value of '2'means that there is no auto-correlation in the sample (Gujrati et al., 2012). Values approaching '0' indicate positive autocorrelation and values towards '4', indicate negative autocorrelation. However, Durbin-Watson test cannot be used to detect higher order autocorrelation among standard errors terms. Durbin–Watson is a test for first order autocorrelation i.e. it tests only for a relationship between an error and its immediately previous value (Brooks, 2014).

1.6.6.4 Heteroscedasticity

One of the important assumptions of OLS is that the variance of the error term is constant (homoscedasticity). If the error terms do not have constant variance, they are said to be heteroscedastic (Brooks, 2014). In the presence of heteroscedasticity, OLS estimators will still give unbiased (and also consistent) coefficient estimates, but they are no longer best linear unbiased estimators (BLUE). They no longer have the minimum variance among the class of unbiased estimators (Brooks, 2014). Use of

OLS regression analysis in the presence of heteroscedasticity may lead to misleading inferences and conclusion (Gujrati et al., 2012).

- **Detection & Solution of Heteroscedasticity**

Various methods are used to detect the problem of heteroscedasticity, for example, Graphical methods, white's general Heteroscedasticity test, Breusch-Pagan-Godfrey test, Goldfeld-Quandt test etc. In the present study, White's General Heteroscedasticity test has been used to check for heteroscedasticity problem. To cross check the results, visual inspection of residuals plotted against fitted values has also been used, which also validate the heteroscedasticity problem. However, the graphs showing residuals plot against fitted values have not shown in the thesis.

The present study has tested the validity of above aforementioned assumptions of regression technique by using relevant statistical tests and arrived at results, which apparently seem to be unbiased.

1.7 ORDINARY LEAST SQUARE REGRESSION MODELS

The study employed time series regression techniques to analyze the impact of independent variables on financial performance measures (dependent variables) of Steel Authority of India Limited. Ordinary Least Square technique of regression has been used to estimate the regression line. The models have been estimated on data of SAIL during the financial period 2005-06 to 2014-15.

For more precise characterization of relationship between the company's financial performance and the selected factors, based on multiple regression analysis, four econometric models were identified.

Model 1: This financial performance analysis model has been used to test the influence of liquidity, solvency and management efficiency on profitability of SAIL during study period. Profitability (dependent variable) has been used as a traditional performance measure of financial performance. The variables used in the model have been proxied by selected ratios. The estimated equation is as follow:

$$ROCE_t = \beta_0 + \beta_1 CR_t + \beta_2\, DER_t + \beta_3\, ITR_t + \varepsilon_t$$

Where,

$ROCE_t$ = Return on Capital Employed at time t (Profitability)

CR_t = Current Ratio at time t (Liquidity)

DER_t = Debt to Equity Ratio at time t (Solvency)

ITR_t = Inventory turnover ratio at time t (Efficiency)

β_0 = Intercept.

$\beta_{1} - \beta_{3}$ = Coefficients of the explanatory variables.

ε_t = stochastic error term at time *t*.

Model 2: This financial performance analysis model has been used to test the influence of liquidity, solvency and management efficiency on profitability of SAIL during study period. Profitability (dependent variable) has been used as a traditional performance measure of financial performance. The variables used in the model have been proxied by selected ratios. The estimated equation is as follow:

$$ROA_t = \beta_0 + \beta_1 CR_t + \beta_2\, DER_t + \beta_3\, ITR_t + \varepsilon_t$$

Where,

ROA_t = Return on Assets at time t (Profitability)

CR_t = Current Ratio at time t (Liquidity)

DER_t = Debt to Equity Ratio at time t (Solvency)

ITR_t = Inventory turnover ratio at time t (Efficiency)

β_0 = Intercept.

$\beta_{1} - \beta_{3}$ = Coefficients of the explanatory variables.

ε_t = stochastic error term at time *t*.

Model 3: This financial performance analysis model has been used to test the influence of liquidity, solvency and management efficiency on Economic Value Added (EVA) of SAIL during the study period. EVA (dependent variable) has been used as a Advanced performance measure of financial performance. The independent variables used in the model have been proxied by selected ratios. The estimated equation is as follow:

$$EVA_t = \beta_0 + \beta_1 CR_t + \beta_2\ DER_t + \beta_3\ ITR_t + \varepsilon_t$$

Where,

EVA_t = Economic Value Added at time t

CR_t = Current Ratio at time t (Liquidity)

DER_t = Debt to Equity Ratio at time t (Solvency)

ITR_t = Inventory turnover ratio at time t (Efficiency)

β_0 = Intercept.

$\beta_{1} - \beta_{3}$ = Coefficients of the explanatory variables.

ε_t = stochastic error term at time *t*.

Model 4: This financial performance analysis model has been used to test the influence of Economic Value Added, Profitability and Market valuation on Market Value Added (MVA) of SAIL during study the period. MVA (dependent variable) has been used as advanced performance measure of financial performance while Profitability and Market valuation have been proxied by selected ratios in the model. The estimated equation is as follow:

$$MVA_t = \beta_0 + \beta_1 EVA_t + \beta_2\ ROCE_t + \beta_3\ MBR_t + \varepsilon_t$$

Where,

MVA_t = Market Value Added at time t

EVA_t = Economic Value Added at time t

$ROCE_t$ = Return on Capital Employed at time t (Profitability)

MBR_t = Market to Book Value Ratio at time t (Market Valuation)

β_0 = Intercept.

$\beta_{1-}\beta_3$ = Coefficients of the explanatory variables.

ε_t = stochastic error term at time *t*.

1.8 LIMITATIONS OF THE STUDY

However, there are many limitations of the present study, which are generally inherent in all such studies. The most important among them are:

- The study is based on secondary data collected from different published sources therefore the results and findings are subject to all limitations inherent in the published financial data.
- The study is limited to a period of ten years only. Analysis has been made for ten years from 2005-06 to 2014-15. More data and information would have made the study more exhaustive.
- The study covered only one company in the Indian steel industry. Therefore, the finding may not be applicable to other companies or entire industry as a whole.
- The present study is largely based on ratio analysis which has its own limitations. As we know that ratio analysis has, like all other methods, limited value and application, it cannot reveal exact picture of the financial performance and its conclusion are not always reliable.
- Statistical test used to analyze the data in the study, has their own limitations. Therefore the result in the analysis is subject to same constraints as are applicable to statistical tools.
- Under the study, a comparative study of the selected company with other companies within the industry was not undertaken.

- The study did not cover the entire financial management, also except finance area, other areas of business were not covered.
- Calculation of EVA required various accounting adjustment but due to unavailability of data and non applicability of adjustments in case of SAIL, only a few adjustment has been made.
- In the calculation of MVA, market value of debt and book value of debt has been assumed to be the same.

The aforementioned limitations were encountered by the researcher but in this endeavor all possible efforts have been made to make the study more exhaustive and goal oriented. Moreover, it is sincerely hoped that the results would be a guide line for SAIL and other Steel companies in India.

1.9 CHAPTERISATION SCHEME OF THE STUDY

The present thesis has been organized into seven chapters. A short overview of each chapter is presented as follows:

The **first Chapter** deals with the Introduction of the study which provides the general information about the subject under research, it also includes statement of the problem, research Design, objectives of the study, scope of the study, significance of the study, need for the study and Research methodology, covering nature & sources of information and tools used for analyzes & interpretation. It also includes hypotheses of the study, limitations of the study and chapterisation scheme.

The **second chapter** gives an extensive review of literature. It deals with reviews of past studies on financial performance analysis of firms in Steel industry as well as in other industries working in foreign countries as well as in India. The review gives an insight into the significance of financial analysis of business firms.

The **third chapter** gives an Overview of Steel Industry throwing light on growth, development, production, consumption, import and export scenario, policies of the government, demand and supply scenario and various issues and challenges related to Indian steel industry.

Fourth Chapter Deals with profile of Steel Authority of India Limited.

The **fifth chapter** entitled 'Financial Performance analysis- A Conceptual framework' deals with the conceptual framework used in the present study. It also discusses the concept of financial analysis, types of financial analysis, procedure of financial statement analysis, importance of financial analysis, limitations of financial analysis, purpose of financial statement. Various techniques of financial analysis like comparative statement, trend analysis, common size statement, fund flow statement, cash flow statement, ratios analysis and concept of Economic value added and market value added are also discussed at length.

The **sixth chapter** deals with Data analysis and Interpretation. In this chapter detailed analysis has been made regarding the financial performance of SAIL. Various accounting ratios were calculated and analyzed to judge the performance of SAIL during study period. Also, EVA and MVA were calculated and analyzed. Various hypotheses framed were also tested in this chapter.

The **Seventh Chapter** entitled 'Summary of Findings, Suggestions and Conclusion', contain the summary of the findings. In this chapter suggestions have been offered in the light of the findings for improving the performance of SAIL. In addition the researcher has given his own ideas by way of a brief conclusion.

1.10 CHAPTER SUMMARY

This chapter discusses the background of the study. It starts with the introduction of subject under research. The chapter discusses the research problem, research design, objectives of the study, scope of the study, significance of the study and research methodology. It is focused on the nature and various source of financial data required to fulfill the objectives of the study. The chapter discussed the hypotheses that have been undertaken by the study. The proposed hypotheses have been framed in the light of prior theoretical and empirical literature. It discussed tools and techniques used for the analyses and hypotheses testing. The chapter covers the limitations of the study and finally, chapterisation scheme for the study.

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Chapter – 2

Review of Literature

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2.0 INTRODUCTION

The objective of this chapter is to review the published literature in the relevant topics of financial performance analysis and to identify the gaps. It is necessary to review the existing relevant literature to investigate and study the problem at hand in a better way. Various studies relating to financial performance have been conducted in the past in India and abroad. However, it is neither possible nor useful to make reference to all such studies.

The present chapter consists of four sections. Section 2.0 Discusses importance of Review of Literature, Section 2.1 gives review of literature based on steel industry in India, Section 2.2 discusses review of literature based on ratio analysis, Section 2.3 gives review of literature based on EVA & MVA analysis and lastly, Section 2.4 discusses the Research Gap.

A brief review of some of the studies conducted in past is given below.

2.1 REVIEW OF LITERATURE BASED ON STEEL INDUSTRY

Arab, Masoumi & Barati (2015) examined the financial performance of identified units in the steel industry in India in terms of financial ratios under Liquidity, Solvency, Activity and Profitability. A group of companies listed in the stock exchanges in India namely, Tata Steel Ltd., Jindal Steel & Power Ltd., JSW Steel Ltd., Bhushan Steel Ltd. and Steel Authority of India Ltd. were selected for the study. ANOVA was used to evaluate the impact of selected variables on the financial performance of identified units in the steel industry. Finally, it was concluded that there was significant difference in financial performance of identified units in the steel industry in India with regard to Liquidity, Solvency, Activity and Profitability Position.

Another study was conducted by **Takeh & Navaprabha (2015)** to analyze the impact of capital structure on financial performance of selected Indian steel companies for a period from 2007 to 2012. Multiple regression model, correlation matrix, ANOVA and descriptive statistics were used for data analysis. OPM, ROA, ROE and ROCE were used as indicators of financial performance (dependent variables) while TDER, TADR, ICR and FDR were used as indicators of capital structure (independent variables). The result indicated that capital structure had significantly impacted financial performance of Indian steel Industry. Correlation results confirmed negative relationship between capital structure and financial performance measures.

Sinku & Kumar (2014) attempted to review the financial performance of Steel Authority of India Limited (SAIL). The study was purely based on secondary data conducted for a period of five years from 2005-06 to 2009-10. The data were tabulated, analyzed and interpreted with the help of various financial ratios and Multivariate Discriminate Analysis (MDA) developed by Prof. Edward I. Altman (1968). It was observed from the analysis of various ratios that the profit earning capacity, liquidity position and long-term solvency position of SAIL was quite good during the study period and the level of bankruptcy position was also very low.

In another study, **Kavitha and Palanivelu (2014)** investigated factors affecting steel industry based on profitability model. Analysis was done for a period of ten years starting from 2002-2003 to 2011-2012. Twenty one firms were taken for the study out of 227 iron and steel firms working in India out of which 168 were listed in stock exchanges in India. ANOVA was used to find whether there was any significant difference between liquidity, leverages and efficiency positions of the firms under study during the selected period of time. It was found that quick ratio, debt equity ratio, proprietary ratio, fixed asset to net-worth ratio and inventory turnover ratio had impacted profitability positions of the steel firms. It was suggested that Companies could reduced the interest burden by giving quality products and should build brand image to increase the profit. It was also suggested that the firms should utilize maximum production capacity and should try to increase production and sales for maximization of profit and to strengthen financial position.

Anilbhai (2013) made an attempt to study financial performance of two selected steel companies of India, SAIL and JSW. The study covered a period of five years from 2008 to 2012.Various financial tools and techniques were used to analyze profitability, liquidity and management efficiency of both the units and t-test was used to test the hypothesis. It was concluded that SAIL has been better than JSW in terms of profitability, liquidity and management efficiency during the period under study. Researcher recommended that JSW should control its cost of goods sold and operating expenses. It was also suggested that JSW should try to utilize its full production capacity and should properly utilize its fixed assets in order to improve its performance.

In a comparative study of financial performance analysis, **Singla (2013)** analyzed financial performance of two leading steel companies in Indian steel industry, SAIL and TATA steel, for a period of five years from 2007-08 to 2011-12. Various financial ratios like current ratio, quick ratio, inventory turnover ratio, operating ratio, gross profit ratio, net profit ratio, dividend payout ratio etc, under category of liquidity, profitability and working capital, were used for the analysis. Result of the study revealed that profitability and inventory management of TATA steel was better than that of SAIL.

Another attempt was made by **Pal (2013)** to study the financial performance of Indian steel companies during 1991-92 & 2010-11. A sample of top ten companies, based on their market share in 2008-09, was selected for the study. Multiple regression analysis was conducted to estimate the impact of fifteen financial ratios from different segments like liquidity, activity, leverage etc, on profitability for all the selected companies. Ratios with high t value but low p value were retained in the model. Finally, Pal concluded that the sale was not the only indicators of profitability but the profitability was also depended upon liquidity, activity and financial leverage of the firms.

Acharya (2013) compared the liquidity position of TATA Steel Ltd. and SAIL and studied the relationship that exists between liquidity and profitability of both the companies. The purpose of the study was to investigate the liquidity management efficiency and profitability position of selected steel companies. Therefore, an attempt was made to investigate the liquidity position and its impact on the profitability of Tata Steel Ltd. and Steel Authority of India Ltd for a period of ten years ranging from 2004 to 2013. Various accounting ratios were analyzed with the help of statistical techniques, such as multiple correlations, multiple regression analysis and t-test. Through the analysis of the data, it was found that liquidity position had positive impact on the profitability of the selected firms.

In another study, **Venkateshan and Nagarajan (2012)** analyzed profitability of selected steel companies of India over a period of six years from 2005-06 to 2010-11. A sample of five steel companies, naming SAIL, TATA Steel, Bhusan, VISA and JSW, were selected for the study. The basis for sample selection was shareholder's population, availability of data, total debt etc. Different profitability and operating ratios were used to analyze the profitability position of the companies. Correlation analysis revealed positive correlation between Operating Profit of Bhusan & JSW while positive correlation was found between Net Profit of SAIL & TATA. Two way ANOVA test was conducted on return on investment (ROI) of selected companies which revealed that there was no significant difference between the ROI of selected companies. The study indicated that profitability depends upon better utilization of resources, cut-off expenses and quality management. Finally, it was concluded that SAIL and TATA have performed better than Bhusan and JSW while VISA was in unsatisfactory financial position during the study period.

Comparing profit earning capacity of selected Steel companies in India, **Popat (2012)** analyzed profitability ratios of selected companies in Indian steel industry. Findings of that study indicated that TATA steel's profitability was better than other selected companies while JINDAL steel's profitability was next to TATA steel. It was also found that JSW and SAIL showed fluctuation in their profitability while UTTAM had a decreasing trend in the profitability during the period of study.

In a case study of TATA steelfor a period of ten years from 2000-01 to 2009-2010, **Goswami and Sarkar (2011)** assessed degree of association of profitability ratio, return on equity (ROE), with liquidity ratios (current ratio, quick ratio & inventory turnover ratio) and leverage ratios (degree of financial leverage & degree of operating leverage) with the help of Pearson correlation coefficient and concluded that ROE was significantly correlated with inventory turnover ratio and degree of financial leverage at 5% level of significance. It was also inferred from the study that because of combined effect of high financial leverage and high operating leverage, the company was in a risky position for first three years of study.

Bhunia and Khan (2011) tried to analyze the association between the liquidity management and profitability of 230 Indian private sector steel companies. The period covered under the study extends to nine years ranging from 2002 to 2010. Liquidity management indicators and profitability indicators were modeled as a linear regression system in multiple correlation and regression analysis. Descriptive statistics disclosed that liquidity and solvency position in terms of debt was satisfactory but liquidity position had no impact on profitability. Multiple regression tests confirmed a lower degree of association between the working capital management and profitability.

In another study, Altman Z score model was used by **Ramaratnam and Jayaraman (2010)** to examine the financial soundness of selected steel companies of Indian steel industry. The study covered a period of five years from 2006 to 2010. Various financial ratios used in Altman Z-score were calculated and statistical techniques such as ANOVA test etc were applied to the ratios to test consistency, stability and overall trends in different ratios. Finally, it was concluded that all selected units were financially sound during the study period while operating efficiency of JSW steel and TATA steel was good.

Mayank (2010) in his project report analyzed financial performance of SAIL from 2003 to 2009 with the help of comparative financial statement, trend analysis, common size statement and ratio analysis. Various ratios under the categories of profitability, liquidity, solvency and management efficiency were calculated. He also compared financial performance of SAIL with other leading steel companies in India Viz., TATA, ISPAT, JINDAL and ESSAR for the year 2009. Finally, it was concluded that sales turnover of SAIL have increased during the study period but profit have decreased, showing increase in cost of goods sold. It was also found that the debtor’s turnover was lower for SAIL when compared with other companies but the liquidity position of SAIL was better than other companies. The study also revealed that SAIL had lower debt-equity ratio during study period and therefore, SAIL can raise more debt in future.

Bhunia and Brahma (2009) attempted to study Indian steel Industry to examine combined impact of liquidity indicators on profitability through the sophisticated statistical techniques. Multiple correlation and multiple regression techniques were applied to study the joint influence of selected liquidity ratios on the profitability. The regression coefficients were tested with the help of t-test. The period for the study was from 1997-98 to 2005-06. Twenty Seven private sector steel companies operating in India were selected for the study. The main objective of the study was to analyze the efficiency of the management of working capital in selected private sector Iron and Steel enterprises in India. The researcher found a higher degree of multiple correlations which implied the presence of some explained variables that led to lower profitability, over and above lower liquidity, for all the companies under study. To remove such problems, suggestion was made to improve internal intervention, specifically working capital investment in terms of short-term liquidity.

In another study **Bardia (2006)** made an attempt to conduct a comparative study of liquidity trends of SAIL and TISCO. The statistical methods such as index number, time series analysis, regression and chi-square test were employed to examine the liquidity position of both the companies. The working capital and sales relationship based on working capital turnover ratio was also analyzed. The statistical technique of hypothesis testing was used to analyze the significance of differences between actual and estimated values of working capital, current assets and current liabilities of both the companies. The liquidity policies pursued by SAIL and TISCO were precisely and effectively presented.

Conducting financial performance analysis of Indian steel industry, **Rohini (2004)** found that investment in research and development in Indian steel sector was inadequate and concluded that technology is the key for competitiveness in the steel industry and only a technology centric push can move the sector to a higher growth path. The authors specifically examined certain major players in Indian steel industry during the downturn as well as in upswing.

2.2 REVIEW OF LITERATURE BASED ON RATIO ANALYSIS

In a case study of ICICI bank, **Gupta (2014)** aimed to analyze and compare the Financial Performance of ICICI Bank for a period from 2009-10 to 2013-14. Financial ratios were grouped in four broad categories: liquidity ratios, profitability ratios, activity ratios and leverage ratios. Results of the study revealed bad liquidity position, continuous improvement in the earning power of the bank and high debt-equity ratio which indicated a precarious amount of financial leverage for the bank. The researcher suggested that the bank should take an appropriate measure to keep current ratio and Quick ratio on par with the norms. The Non Performing Assets (NPAs) of the ICICI bank were more than one per cent, hence it was suggested that the bank should control its NPAs otherwise it might affects the asset quality of the bank in long run. It was also suggested that proper control over leverage should be taken in order to magnify DP ratio and the spread of the ICICI bank should be controlled otherwise the income of the bank might be eaten away by the interest expenses in the long-run.

Ahmed and Ahmed (2014) conducted a study to analyze the effect of mergers upon financial performance of manufacturing industries in Pakistan. Twelve manufacturing companies were selected for the study which had involved in the process of merger during 2000-2009. Three years data before merger and three years data after merger were used to test the significance of study. Paired sample t-test was applied on accounting ratios. The study revealed that overall financial performance of acquiring manufacturing corporations were insignificantly improved after the merger. The liquidity, profitability and capital position of the selected companies were insignificantly improved and the efficiency deteriorated after the merger. Finally, it was concluded that merger impacted on different industries of manufacturing sector differently.

In another study, **Agha (2014)** attempted to empirically test the impact of working capital management on profitability of GlaxoSmithKline pharmaceutical company listed in Karachi stock exchange. The study was conducted for a period from 1996 to 2011. Return on assets ratio was used to measure the profitability of company while account receivable turnover, creditor turnover, inventory turnover and current ratio were used for working capital management criteria. The results of the study revealed significant impact of working capital management on profitability of the company, although no significant effect of increasing or decreasing the current ratio was found on profitability. Results of the study confirmed that through proper working capital management, the company can increase its profitability. Finally, it was suggested that the profitability of the firms might be enhanced by minimizing the inventory turnover, account receivables ratio and by decreasing creditor turnover ratios.

Niresh &Velnampy (2014) examined the effects of firm size on the profitability of fifteen companies, active in Colombo Stock Exchange (CSE) during 2008 to 2012. Return on Assets and Net Profit were used as measures of firm profitability, whereas Total Assets and Total Sales were used as indicators of firm size. Correlation and regression analysis were used in the empirical analysis. The results of the analysis indicated the existence of weak positive relationship between size indicators and profitability of the listed manufacturing firms while negative association was found between Asset Turnover and performance measures. Lower Asset Turnover indicated inefficiency of management in utilizing the assets and decline in profitability of the firms.

In another study conducted by **Shanmugam and Kavitha (2014),** working capital policies of twenty one firms out of thirty large pharmaceutical firms were analyzed for a period of ten years from 2000-01 to 2009-10. Ratio analysis, descriptive statistics, one-way ANOVA, Tukey’s Honestly Significantly Different (HSD) tests, rank order correlation and regression analysis were used for the analysis. Result of the study indicated that pharmaceutical firms followed conservative investment and financing policies during study period. No uniformity in the policies of firms was found despite the fact that they were in same industry. There was a change in policies of all the firms over the period. Further, there was a strong stability in each industry’s relative level of aggressiveness with respect to working capital investment policies over the period of time and a negative relation was found between working capital policies and profitability.

In another study, **Saravanan and Abarna (2014)** aimed to analyze the liquidity efficiency of selected Automobile companies in India. The study covered a period of sixteen years from 1997-98 to 2012-13. Researcher selected five companies (Ashok Leyland, Eicher, Forcec, SML and TATA motors) out of 26 companies in Indian automobile industry. Hypotheses were tested on the basis of ANOVA one-way analysis of variance test. Through the study, the researcher concluded that the liquidity position of force motors was better than other selected companies and suggested that other companies should improve their liquidity and turnover for better performance.

Dharmaraj and Kathirvel (2013) made an attempt to study financial strength of automobile industry in India. The study covered a period of fourteen years from 1998-99 to 2011-12. A sample of fifteen companies was selected to analyze financial strength, profitability and liquidity. Various financial ratios were calculated under profitability, liquidity and solvency categories and descriptive statistics and ANOVA were used for the analyses. Finally, the researchers concluded that financial performance of Atul Auto Ltd, Ashok Leyland, HMT Ltd, TATA motors and SML ISUZU Ltd was highly improved as compared to the group average value for all selected ratios and the automobile industry was growing at 17% per annum, contributing in the country’s growth.

Analyzing financial position of City Union Bank, **Dhevika, Latasri and Gayathri (2013)** attempted to find the financial position of City Union Bank. The period undertaken for the study was from 2007-08 to 2011-12. Various financial ratios like gross profit ratio, net profit ratio, operating ratio, dividend payout ratio, turnover ratio etc were used for financial analysis. Finally the study revealed that despite of the price drops in various products, the company has been able to maintain and grow its market share contributing to the strong financial position of the bank.

In another study, **Chandrashekaran, Manimannan & Priya (2013)** made an attempt to analyze financial performance of private and public sector companies from five major industries in India over a period of ten years from 2001 to 2010. Factor analysis, k-means clustering, discriminate analysis and perceptual techniques were used for data analysis. The selected companies were divided into three categories i.e. H-class (high performance), M-class (moderate performance) and L-class (lower performance). Results of analysis revealed that financial analyst can make use of these techniques and companies can project their performance on the basis of financial ratios that were considered in the study.

Mohamad and Said (2013) performed a study to measure and compare the profitability of selected top-listed government linked and non-government linked companies in Malaysia. Data envelopment analysis (DEA) was used to measure the relative performance of each company by utilizing a list of normalized performance indicators for the period 2009-2011. In addition to estimating technical and scale efficiency, DEA also provided a mean of measuring returns to scale – increasing, constant or decreasing and identifying companies exhibiting the most productive scale size. The DEA scores indicated that only a small number of the companies were operating on the best-practice frontier under the assumptions of constant and variable returns to scale. Comparisons were made between government-linked and non-government linked companies. Most of the companies indicated serious scale inefficiency and exhibited decreasing return to scale.

In another study, **Sandhar and Janglani (2013)** Endeavored to analyze the working capital management in terms of profitability and liquidity in a sample of firms selected from the cement companies listed in the NSE. The data was analyzed with the help regression analysis to find out the impact of liquidity on profitability, Correlation analysis was used to find out the relationship between liquidity with profitability. The study revealed that liquidity ratios measure by current ratio (CR), Liquid ratio (LR) and Cash Turnover Ratio, CATAR, CLTAR had a diminutive relationship with profitability measured by return on capital employed (ROA and ROI). It was also revealed that CR and LR were negatively associated with ROA and ROI, while Cash Turnover Ratio (CTR) was negatively associated with ROI and ROA. The analyses also revealed inverse direction of CR and LR with profitability ratios, ROA and ROI. Result of the study was found consistent with the theoretical foundation of liquidity- profitability trade off theory.

Sivathaasan et al. (2013) conducted a study to investigate impact of **c**apital structure, working capital, firm size, non-debt tax shield and growth rate, on profitability of selected manufacturing companies listed in Colombo Stock Exchange, Sri Lanka. The study was conducted for a period of five years starting from 2008 to 2012. The study employed multiple regression analysis to measure relationship among variables and their overall impact on profitability. The results revealed that whereas all independent variables explain 76.6% and 84.7% of the variance in ROA and ROE, respectively at 5% levels of significance, the overall model had a significant impact on profitability. Further, while capital structure and non-debt tax shield had statistically significant positive impact on profitability, working capital, growth rate and firm size had insignificant effect on the profitability.

In a study conducted by **Alfan & Zakaria (2013),** the performance of construction companies in Malaysia were analyzed using financial ratios and Altman z-score model before, during and after the crisis. In addition to that, the study assessed and predicted the future performance of these companies. A sample of five large companies was selected for the study. Based on data of six year, starting from 2004 to 2009, the results showed that the financial performance of the contractors in Hong Kong had deteriorated very fast during the past few years. The results of all financial ratios, together with the prevailing situation of over competition, inelasticity of construction costs and reduced aggregate demand in Malaysia, revealed the extreme difficulty of reversing the financial performance in the coming years.

Zafar and Khalid (2012) carried out a study on financial performance analysis of two leading automobile companies in India viz. Maruti Suzuki and TATA Motors. The study was based on a period of five years ranging from 2006 to 2010. Financial ratio analysis was used to analyze liquidity, profitability, efficiency, leverage and market value position of both the companies during the study period. It was found that Maruti Suzuki had been more efficient and performed better in terms of liquidity, profitability, solvency position and market value than TATA motors during the period of study. Finally, the researchers concluded that Maruti Suzuki had better strategic position in comparison to its competitors.

In another study, **Marimuthu (2012)** analyzed financial performance of selected firms in textile industry of Tamil Nadu. A sample of five firms was selected for the study. The study covered a period of eleven years ranging from 2001 to 2011. Various financial ratios were used to analyze liquidity, profitability and efficiency of selected firms in the study. The data collected was examined using descriptive statistics while

ANOVA-single factor analysis was used to compare the variables. The findings of the study indicated that liquidity ratios, debt-equity ratios and creditor’s position were significantly different for the selected companies. It was also inferred from the study that KPRML and RML were playing very well in the competitive market and particularly KPRML had been efficient in generating income and assets with good overall efficiency.

Shaji and Ganesan (2012) study financial performance of two pharmaceutical companies in India. The study covered a period of twelve years from 1998-99 to 2009-10. Liquidity ratios, Profitability ratios and Efficiency ratios were used for comparative analysis of the selected companies. Variables of the study were analyzed with the help statistical techniques including t-test. Finally, it was inferred from the results of analysis that the liquidity position of both the companies has been strong during the period under study but the companies relied more on external fund in case of long term borrowing and financial stability ratios of both the companies had a downward trend.

Dastgir, Momeni, Daneshwar and Sarokolaei (2012) conducted a study to analyze financial statements of companies listed in Tehran stock exchange with the help of window data envelopment analysis model. A sample of hundred firms was selected to study their financial performance for a period of six years from 2005 to 2010, dividing the period into four windows of three years each. Finally, the researchers came with the result that none of the company showed stable performance during the period under study.

Singh and Tandon (2012) in their research paper found that SBI performed well and financially sound in comparison to ICICI bank while ICICI bank showed better managing efficiency in terms of deposits and expenditure than SBI. The study covered a period of six years ranging from 2006-07 to 2011-12. The financial performance of the selected banks were evaluated with the help of financial ratios like credit deposit, net profit margin etc.

In a study, **Vural, Sokemen and Cetenak (2012)** investigated the relationship between working capital management and performance of the firms by using dynamic panel data analysis. Data was collected for 75 manufacturing firms listed in Istanbul

Stock Exchange for a period from 2002 to 2009. These 75 manufacturing firms were exposed to 600 observations. Five models were developed to make empirical research on the associations between working capital management and firm's performance. Tobin Q as a proxy of firm value and gross operating profit as a proxy of profitability, were used as measures of firm's performance in the study. Findings of the study revealed significant relations between working capital management and firm performance while significant negative relationship of leverage was found with firm value and profitability. The results demonstrated that firm's profitability increased by shortening collection period of accounts receivable and cash conversion cycle while increase in the level of leverage led to decline the profitability and value of the firm.

Duvvari (2012) attempted to evaluate the financial efficiency and performance of the company and to forecast financial health of the company. The period of the study was from 2001 to 2011. The study was conducted with the help of K. B. Mehta's Model, which is a modified version of Altman's model. The Z score of NFCL based on modified Altman's model was ranging from 0.53 to 1.93 during the period of the study. It was found that the company had successfully entered the grey area from bankruptcy area and was moving towards safe zone. Based on the result of the study, it was suggested that the investors who are interested in the fertilizer industry could confidently park their surplus funds in the company.

Another attempt was made by **Memon and Tahir (2012)** to examine the performance of fourteen manufacturing companies in Pakistan using financial ratios. The study was conducted for a period of five year starting from 2006 to 2010. It was found that ENGRO, being the largest company by total assets for three years (2006, 2007 and 2008), had more expenses, lower sales, lower profit before tax and lower return on assets compared to other thirteen companies. FCC, being the second largest company by assets, showed higher sales, higher profit before tax and higher return on asset during five years (2006-2010). Furthermore, NRL being the fourth largest company, showed the highest sales during five years and lowest expenditures in 2010 as compared to other thirteen listed companies. However, it had declining profit before tax and return on asset over the study period and lowest profit before tax in 2010. The financial position of other listed companies was found mixed during study period. Correlation analysis indicated that total assets, sales and profit before tax were positively related indicating economies of scale where large firms were able to take advantage of their size. Finally, it was concluded that higher expenses were the results of either the Expense Preference Behaviour Theory or slow growth rate of investment.

Pratheepkanth (2011) attempted to identify impact of capital structure on financial performance of companies listed on Colombo stock exchange. Variables of the study included debt-equity ratio and profitability ratios. Researcher found weak positive and negative correlation between capital structure and financial performance measures of selected firms. Regression analysis revealed an insignificant relationship between capital structure and financial performance of selected firms during study period.

In a comparative study of pharmaceutical firms, **Salman and Qamar (2011)** investigated financial performance of two multinational pharmaceutical companies, GlaxoSmithKline and SanofiAventis using financial ratio analysis. They used various ratios under the segments liquidity, profitability, activity, solvency, marketability and growth. The study covered a period of five years covering years from 2005 to 2009. ANOVA and independent t-test were used for comparative analysis. The result of the analysis revealed that the performance of both the companies had improved during the period under study. However, GlaxoSmithKline was leading SanofiAventis during study period.

Owolobi, Obiakor and Okwu (2011) investigated the relationship between liquidity and profitability of selected companies in Nigeria. Three companies, each from Banking, processing and manufacturing industries were taken for the study. The study covered a period of seven years from 2003 to 2009. Current ratio was taken as measure of liquidity while operating profit-turnover ratio was taken as measure of profitability. Correlation and regression analysis were used to determine the nature, extent and cause & effect relationship between the selected ratios. A model of perceived functional relationship was specified and estimated with the help of OLS technique. A negative relation was found between liquidity & profitability in case of Banking Company while a positive relation was found in case of processing and manufacturing companies. Therefore, a trade-off between liquidity and profitability was found in banking business while the liquidity & profitability reinforced each other in processing and manufacturing businesses.

In another study **Srinivasan et al. (2011)** analyzed the performance of selected Foreign Direct Investment (FDI) assisted pharmaceutical units in India. 23 companies were taken for the purpose of analysis for a period from 1st April 1999 to 31st March 2008. Capital Structure Ratios, Liquidity Ratios, Profitability Ratios, Du Pont Analysis and Return on Investment ratios were used in the study to evaluate the financial performance of FDI pharmaceutical units in India. It was found that most of the units performed well and have shown positive growth while the remaining units showed downward trend where most of the units were lagging due to improper utilization of the funds.

Investigating determinants of profitability, **Vijayakumar (2011)** attempted to examine the determinants of profitability of selected firms in Automobile Industry using the techniques of ordinary least squares. Author found that size is the strongest determinants of profitability of Indian Automobile Industry followed by the variables vertical integration, past profitability, growth rate of assets and inventory turnover ratio. It was concluded that industry should consider all these possible determinants while considering its profitability.

Afeef (2011) aimed to determine the potential effect of working capital management on the profit performance of Small and Medium sized firms in Pakistan. Effect of working capital management was determined on profitability of a sample of 40 Pakistani small and medium enterprises (SME's) listed in Karachi Stock Exchange for a period of six years from 2003 to 2008 which led to a total of 240 firm-year observations. Correlation analysis was conducted to determine the relationship between efficient management of working capital and corporate profitability for the sample under study while the Multiple Regression analysis was employed to explore the combined effect of the variables of working capital management on profitability of selected firms. Results of the analyses revealed that indicators of working capital management had a perceptible impact on profitability of firms under study.

In another study, **Kumbirai and Webb (2010)** investigated performance of South Africa's banking sector for a period from 2005 to 2009. Variables included various financial ratios to measure profitability, liquidity and credit quality. A sample of five large South African commercial banks was selected for the study based on their market capitalization in the year 2009. The researchers examined if there was any significant difference in the performance of the banks in 2005-2006 and in 2007-2008, using student t-test. Finally, it was concluded that while the performance of banks in 2007-08 deteriorated due to global slowdown in terms of profitability, banks were able to maintain their liquidity and credit quality during the period of financial crises.

Sangmi and Nazir (2010) evaluated financial performance of two major banks operating in northern India with the help of CAMEL model. Key parameters of CAMEL model, Capital adequacy, Asset quality, Management capability, Earning capacity and Liquidity were analyzed for both the selected banks. The period undertaken for study was from 2001 to 2005. Findings of the study indicated that both the banks have managed their capital adequacy ratio above the minimum standard of 10%, fixed by RBI. The study also revealed that both the banks have shown significant performance in asset quality but Punjab National Bank (PNB) has been more successful in management efficiency than Jammu and Kashmir Bank (JKB) while liquidity of JKB was better than PNB.

Sharma (2010) made an attempt to study liquidity, risk and profitability of Maruti India Ltd. The period covered under study was from 2001 to 2010. Liquidity ratios, profitability ratios and calculated risk factor were used to analyze liquidity, profitability and risk, respectively. Sharma established relationship of liquidity and profitability of the company with risk factor. T-test was applied for hypothesis testing. Finally, the Researcher concluded that the company earned good profit with moderate liquidity but at a higher risk, during study period.

Menapara and Pithadia (2009) attempted to measure the impact of mergers and acquisitions on financial Performance of Indian Corporate Sectors and to evaluate the impact of merger and acquisitions on Profitability and Liquidity position of selected companies. Ratio analysis, Standard Deviation and t-test were used as tools for analysis. Pre-merger and post-merger performance ratios were estimated and the averages were computed for the selected units, during five years before merger and five years after merger. Average Pre-merger and post-merger financial performance ratios were compared using Student Paired t distribution test to find if there was any statistically significant change in financial performance due to mergers. The Conclusion emerged from the point of view of financial evaluation was that the merging Companies were takeover by companies with reputed and good management. Therefore, it was possible for the merged firms to turnaround successfully in due course.

Balasubramanian (2007) tried to evaluate the financial performance of Indian private sector banks and rank them based on the basis of business per employee, return on assets, profit per employee, capital adequacy, credit deposit ratio, operating profit and percentage of net non performing asset to net advance. A consolidate ranking was also calculated. Data were collected for a period of three years ranging from 2003-2004 to 2005-2006 from all Indian private sector banks. Return on assets was used to measure the profitability of the banks, Profit per employee and business per employee were used as measure of efficiency of the employee working in bank, credit deposit ratio was used as a measure of liquidity position of the bank and Net NPA as a percentage of Net advances, was used to study the quality of the assets of the bank. Finally, the researcher concluded that the new generation private sector banks have used the technology and have utilized the manpower in an effective manner.

Sori, Hamid, Nasir and Mohamad (2006) tried to investigate the distributional characteristics of selected financial ratios of failed and non-failed Malaysian listed firms. A total of 66 listed firms with 330 observations and 65 variables were examined for a period ranging from 1980 to 1996. Normality test was carried out using Kolgomorov-Smirnov test adjusted to Lilliefors test. The finding of the study indicated that in all instances, only one variable (i.e., current asset percent) conformed to normal distribution. Remedial actions were carried out using three-transformation techniques namely natural log, square root and square. The natural log transformation outperformed the other techniques and the square transformation was the least effective. It was concluded that outlier trimming improved the normality of variable after the data transformation and this technique was more effective on the specific industry compared to the mixed industry sector.

In another study, **Atkotiya (2005)** analyzed and evaluated financial performance of Tea industry in India. The study covers ten reputed tea companies in India. The selected firms were thoroughly examined for their financial performance during 1997-1998 and 2002-2003. Statistical techniques used for the purpose of financial appraisal involve, among others, regression and correlation analysis. To test the hypothesis Kruskal Wallis one-way analysis of variance test was also used.

Kakani and Kaul (2002) conducted sector specific empirical analysis to determine the firm characteristics and performance nexus in varying financial and socio-economic conditions. Forty firms from textile sector and forty two firms from transportation equipment industry were analyzed over a time span of eight years ranging from 1992 to 2000. This eight year period was divided into two sub-periods of four years each, the first period from 1992-93 to 1995-96, being a period of economic growth and the second one from 1996-97 to 1999-2000, being a period of relative recession. It was found that firm size was the most important factor influencing its financial performance. To this effect, industry level analysis was performed looking into the nexus of firm characteristics and their performance numbers in a high performing (transportation equipment) and a low performing (textile mill) industry. The study led to the conclusion that in an industry level analysis, size of the firm was the most significant factor influencing its shareholder value in the liberalized era.

Assessing Performance of Indian State-Owned Enterprises, **Ahuja and Mujamdar (1998)** examined the determinants of performance of 68 Indian state-owned enterprises in the manufacturing sector for a five-year period ranging from 1987 to 1991. Relative performance was determined using data envelopment analysis, and variations in performance patterns were explained with the help of regression analysis. T-test was used for hypothesis testing. It was noted that the performance of firms in the Indian state-owned sector was characterized by both, low performance as well as significant and systematic variations in the performance parameters. The researcher found that the Size of the firm was positively associated with efficiency while the age was negatively associated with efficiency. Finally, it was concluded that the economic liberalization and reforms aimed at improving the performance of state-owned firms induced efficiency gains over the period of time.

Boubakri and Cosset (1998) in their research paper, examined the change in financial and operating performance of 79 companies from 21 developing countries that had experienced full or partial privatization from 1980 to 1992. Due to the possibility of the differences between pre privatization and post privatization performance of the firms due to economy wide factors, unadjusted performance measures as well as performance measures adjusted for market effects, were used. Results revealed significant increases in profitability, operating efficiency, capital investment spending, output, total employment and dividend for both unadjusted and market-adjusted performance measures. Researchers also found a decline in leverage following the privatization for unadjusted leverage ratios. Finally, it was suggested that privatization had yielded greater benefits for the companies which were operating in developing countries with high income per capita and for companies whose governments had surrender voting control.

2.3 REVIEW OF LITERATURE BASED ON ECONOMIC VALUE ADDED & MARKET VALUE ADDED ANALYSIS

Patel (2015) in his doctoral thesis examined the ability of Indian automobile industry in creating value for the shareholders. Players of the Indian Automobile Industry were selected on the basis of their performance, capital and turnover representing various segments of the industry. The financial performances of the selected companies were analyzed with the help of traditional performance indicator (ROI) and new corporate performance measure (EVA) for a period of nine years from 2003-2004 to 2011-2012. Result of the analysis revealed that the companies had been successfully able to create value for its shareholders and there has been a significant increase in EVA of the Automobile firms indicating that companies have a positive trend to improve their firm values.

In another study, **Prasad & Shrimal (2015)** attempted to find the relationship between financial measures and MVA. MVA was taken as dependent variable and the profitability ratio (GPM, NPM, ROCE, ROE and RONW) and market value ratios (EPS, PER and DPR) were selected as independent variables. A Sample of 23 listed infrastructural companies of CNX Infrastructure Index was taken for the study. The period of the study was from 2009-10 to 2013-14. Results of the analysis revealed a positive relationship between MVA and financial performance measures of selected infrastructural companies during the period of the study.

Sharma & Grover (2015) in a study revealed that Dividend and Capital structure have influence on the Shareholder Value Creation. Dividend and capital structure were taken as independent variable and EVA was taken as dependent variable. Regression technique was used to examine the impact of Dividend and Capital structure on Shareholder Value Creation (SVC). Findings of the study also revealed that mostly all companies were having positive EVA during study period indicating that the selected companies, along with the profit maximization, had also focused on the objective of wealth maximization.

Aslam et al. (2015) examined the performance of listed companies in Karachi Stock Exchange with the help of economic value added (EVA) and market value added (MVA). Applying multiple regression technique, performance of 35 firms from seven industrial sectors in Pakistan were estimated with the help of EVA and traditional performance measures (operating cash flow, net operating profit after tax, net income and return on equity) for the year 2012 and 2013. Findings indicated that ability of EVA to explain MVA was insignificant. Finally, the researchers concluded that although the companies operating in Pakistan were still depending on traditional performance measures but EVA can play a vital role when combined with other variables.

Hall (2013) aimed to determine whether more refined firm categorization and increase in the number of variables would yield more information on value creation measures that financial decision-makers can use. For the purpose of the study, four different categories of firms were compiled and 11 different internal performance measures were regressed against two different external shareholder value creation measures for each category. The empirical results showed that different value creation measures could best explained the shareholder value creation for different categories of firms. Market Adjusted share Return was found to be a better indicator of shareholder value than Market Value Added in case of the total category and capital intensive firms. Researcher suggested that for firms with a positive EVA and labor intensive firms, neither of these two measures should be used. Further, it was concluded that the economic-based value indicators performed better than the accounting-based measures with the SPREAD (ROCE minus WACC) turning out to be the best. The ROA and EPS were also found to be good internal value indicators. The results also showed that the internal value indicators differed when different external shareholder value measures (MVA or MAR) were used.

Joibary (2013) investigated the relationship between traditional performance measures and Economic Value Added (EVA) and identified effective factors and important variables for Companies listed in Tehran Stock Exchange (TSE). The study focused on one hundred and eighty Companies listed in Tehran Stock Exchange (TSE) and covered five financial years to investigate relationship between Economic Value Added (EVA) as dependent variable and Market Value Added (MVA) and financial ratios as independent variables. Results indicated EVA in model 1 could not create worth for shareholders but EVA in model 2 has been successful in creating value for investors and shareholders. Also, the average of MVA in each three models 1, 2, and 3 had positive amount and therefore, listed Companies of TSE created external value for shareholders and investors. The main difference between calculation of EVA in models 1 and 2, was in calculation of weighted average cost of capital with Dividend discount models and Capital Assets Pricing models.

Sharma & Kumar (2012) aimed to examine whether Economic Value Added (EVA) can be used as a tool of performance measures and to provide evidence about its superiority as a financial performance measure as compared to conventional performance measures in Indian companies. To achieve the objective of the research, performance of the Indian listed manufacturing companies was compared with traditional mandated corporate financial performance measures used in investment analysis. The results of the study revealed that investor should use EVA along with traditional measures in firm valuation and making investment strategy. Regression results indicated positive and significant relationship between EVA and MVA of Indian companies. Another observation from the results was that, since EVA outperforms NOPAT, it can be used as proxy for market return (MVA). The regression results indicated that EPS and RI dominated over EVA in explaining the MVA. Finally, the researchers concluded that although EPS is best measures of shareholder valuation but EVA can also be used by investors in making investment decision and in firm valuation.

Khan et al. (2012) empirically examined Economic Value Added of the companies listed in BSE. For the purpose of the study, a sample of the firms from BSE-30 companies was taken. Multiple correlation analyses were applied for the purpose of analysis. The study aimed to find the correlation between EVA and MVA and to find the influence of company's profitability, size (net worth) and growth ability's (sales growth) on EVA. The study uncovered the fact that in the sample units, data correspond to MVA, EVA, Turnover, Net worth and Profitability demonstrated no significance except EVA and Profitability. Finally, the researchers concluded that the positive direction of relationship in all the significant cases suggests that the profitability is an important factor for creating value in BSE-30 companies.

Sakthivel (2011) attempted to analyze the value creation in Indian Pharmaceutical Industry from 1997-98 to 2006-07. Fifteen pharmaceutical companies were selected from Indian Pharmaceutical Industry as sample companies by considering the constituent companies in BSE 200 Index whose shares were traded continuously on all market days. To test the significant impact of EVA and Productivity on value creation, ANOVA and simple regression analysis were used. To analyse the impact of financial and economic variables on value creation, a multivariate technique, multiple linear regression was applied. Analysis revealed that the companies with high level of EVA were very highly valued and differed from valuation of companies with low and moderate EVA groups indicating a significant association between MVA and EVA of companies in pharmaceutical industry. Further, it was found that total productivity failed to explain value creation in short-term, but it had some influence on value creation in the long-run. It was also found that EVA is the only variable which had unique influence on MVA of Pharmaceutical companies. Hence, it was concluded that Economic value added had positive & significant impact on Value Creation for Pharmaceutical companies.

Sharma (2010) made an attempt to review the literature on EVA. Author presented the literature classification scheme by categorizing the articles in seven sub-streams of EVA, viz., EVA –MVA relationship, EVA and stock returns, managerial behaviour and performance management, concept, criticism, application and strategy, value management, discounting approaches and literature survey. From the analysis of studies, it was felt that further research is needed on implementation issues, role of accounting adjustments, empirical evidences in developed economies, EVA as a strategy, EVA and discounting techniques like NPV, IRR and managerial performance measurement aspects of EVA. Author also found that Empirical studies conducted till date on EVA had used data for smaller period whereas there is scope for future research on the concept by considering the data pertaining to longer durations in order to test the validity of the concept. Finally, conclusion was made that efforts should be made in this direction to further broaden the horizon of applicability of this useful concept.

Muthumeenakshi (2010) conducted a study to analyze the ability of Economic Value Added (EVA) in reflecting the financial performance and the market performance of Indian firms. An attempt was made by the author to investigate if EVA can be used as an internal performance measure as well as investor investment decision making facilitator in Indian Corporate Sector. Researcher analyzed the ability of EVA in explaining the returns from equity of the sample firms. The returns from equity were taken as dependent variable and EVA values of the companies were taken as the explanatory variable. Regression analysis proved that the relationship of equity returns and EVA was not statistically significant. Further, the statistical relationship of the risk adjusted equity returns (calculated using Treynor's measure) of the portfolios on EVA was also analyzed. From the regression analysis it was proved that EVA had no impact on the risk adjusted equity returns too. Finally, it was found that EVA can not be used as a reliable single measure for investment decision making of investors in the Indian context.

Irala (2007) endeavored to examine whether Economic Value Added has better predictive power relative to the traditional accounting measures such as EPS, ROCE, RONW, Capital Productivity (Kp) and Labor Productivity (Lp). Researcher made Analysis of 1000 companies across six years. T test was used to examine the significance of the regression models. Finally, it was concluded that the EVA was better predictor of market value compared to other accounting measures.

2.4 RESEARCH GAP

The researcher reviewed various studies on financial performance analysis which revealed that enormous work has been done in the area of financial performance analysis in the past. A number of studies have been made on human resource, marketing and production management and about the causes of poor performances of public sector companies. Most of the studies have been done in other sector of the economy regarding their financial performance. Some studies have been conducted on the financial performance analysis of companies in Indian steel industry, a few studies have been conducted on financial analysis, especially in Indian public sector steel companies and a few comparative studies have been conducted between SAIL and other Indian Steel companies but no particular study have been made on SAIL regarding its financial performance especially using advance performance measures like EVA & MVA. Also no study has considered Industry average ratios as benchmark ratios in Indian Steel Industry. Hence, in the present study, the researcher has made an attempt to evaluate the financial performance of one of the major public sector steel company of India, Steel Authority of India Limited, using both traditional techniques of ratio analysis as well as advance techniques of value addition. Further, financial ratios of SAIL have also been compared with the industry average ratios that have been used as benchmark ratios in the present study. Therefore, through the present study the researcher has attempted to fill the gap of research in this specific area of study

2.5 CHAPTER SUMMARY

This chapter being dealt upon reviews of literature related to financial performance analyses which were the basis for planning of the thesis. After studying the available literature, research gap has been identified. The next chapter will provide an overview of Indian steel industry.

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Chapter - 3

An overview of Indian Steel Industry

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An Overview of Indian Steel Industry

3.0 INTRODUCTION

Steel is one of the world's most essential materials. From infrastructure and transport to the tinplated steel container that is used to preserve the food, steel is basic to every aspect of our lives. Steel is strong, versatile and most importantly, it is infinitely recyclable. Iron is the second most abundant metal on Earth, first being the Magnesium and is one of the oldest inventions in the history. It was first reported in 4000 BC. Steel is crucial for the development of any modern economy and works as backbone of human civilization. Steel is a cornerstone and key driver for the world's economy (Walters, 2012). Per capita consumption of steel is used as an important index of the level of socio-economic development and living standards of the people in the country. All major industrial economies are characterized by the existence of a strong steel industry and the growth of many of these economies has been largely shaped by the strength of their steel industries in their initial stages of development (Barad, 2005).

3.0.1 Brief History of Steel

Although the rise of steel began in 19th century with Industrial Revolution in Europe and North America, steel making is not new. Ancient Chinese and Indians were skilled in its production. The industrialization of steel production in the 19th century has helped in building our modern world, but the origins of steelmaking go thousands of years back.

More than 4,000 years ago, people in Egypt and Mesopotamia discovered meteoric iron and considered that as gift of the gods. The world oldest steel known till yet is a 4000 years old piece of steel excavated in Kaman-Kalehuyok which is an archeological site in Turkey ("Ironware piece", 2009). The earliest finds of smelted iron in India date back to 1800 BCE when the Hittites of Anatolia began iron smelting around1500 BCE (WSO, 2012). History of steel has its roots in the Iron Age, theperiod started after the Bronze Age period and characterized by prevalent use of iron and steel. Although, the period of Iron Age has not been uniform for different region of the world, but Iron Age began after the collapse of Bronze Age around 1500 BC and last till 400 AD ("Iron age", n.d.). However, iron is not steel. Iron Age metal worker discovered steel as an accidental by-product of their ironworking activities. These early smiths heated iron ore in charcoal fires, which produced a relatively pure spongy mass of iron called a 'bloom' that was hammered (wrought) into shape (WSO, 2012).

Early sub-Saharan Africans developed metallurgy at a very early stage, possibly even before other peoples, around 1400 BC. Steel was also used by Roman military in Roman Empire. An archaeological finding in Cyprus indicated that steel workers were producing quench hardened steel knives (A technique of rapid cooling of the worked steel in water or oil to increase its hardness) as early as 1100 BCE. Spartans also used steel for making their swords against their enemies equipped with only iron or bronze weapons and that was the secret of their supremacy from700 BC to 400 BC ("Steel secret of Spartans", 1961, O'connor, 2002).

In India, technique of producing high quality of steel was developed in southern India around 300 BC and the steel was known as wootz steel (Hirtz, 2010). From India, wootz steel was exported to ancient Europe and Arab world where it became famous, particularly in Middle East, where it was known as Damascus steel. Wootz steel and Damascus steel aroused curiosity among European scientific community from 17th century to 19th century, which played an important role in the development of modern English, French and Russian metallurgy (Smith, 1960)

Chinese craftsmen manufactured high-quality steel. Steel was created by Chinese people during the reign of Han dynasty in first century AD. They melted wrought iron and cast iron together to get intermediate carbon steel (Needham, 1986). Steel agricultural implements were widely used in the Tang Dynasty, around 600-900 CE.

With expertise in producing steel, traders in India and China created an international market for steel. Much of the demand for early steel was created by warfare. Armies of China, Greece, Persia and Rome, were eager for strong, durable weapons and armour. By the 15th century, steel got well established worldwide. But the use of steel was not confined to military purposes. Many tools such as axes, saws and chisels began to incorporate steel tips to make them more durable and efficient (WSO, 2012). Yet, despite its growing use, making steel remained a slow, time-consuming and expensive process.

In the 17th century AD, a new process known as cementation process was used to produce steel in Europe but with time, cementation process for steel production became obsolete and in 1740, a young Englishman, named Benjamin Huntsman, revealed a new technique. Using a crucible, he was able to achieve temperatures to melt the bars created in the cementation process and cast the resulting liquid steel to create steel ingots of uniform high quality and in relatively high quantities (WSO, 2012).

Demand for iron and steel increased with the progress of Industrial Revolution. These metals were significant to trade and transport like railways and ship building. Henry Cort developed two ground-breaking techniques to meet these needs patented in 1783 and 1784 (WSO, 2012). By 1800s, large-scale industrialization was spreading throughout the Europe.

In the1850s and 1860s, new techniques emerged that made mass production possible (WSO, 2012). According to Encyclopaedia Brittanica's "Beesemer" entry (2016), this transformation is largely associated with the work of one English inventor, Henry Bessemer. Bessemer process was invented by Henry Bessemer in 1856. Before Bessemer process, production of steel was very expensive and steel was used only in expensive items like knives, swords and armours, but after the invention of Bessemer process, bulk and cheap production of steel became possible and steel began to be used in ship plate and railways, replacing the use of wrought iron. The Bessemer process remained the heart of steelmaking for more than 100 years (WSO, 2012). At the same time Carl Wilhelm Siemens, a German engineer, was developing regenerative furnace. Siemens' process could generate temperatures high enough to melt steel. In 1865, a French man Pierre-Emile Martin applied Siemens's technology to create Siemens-Martin open hearth process. Although, not quite as fast as the Bessemer process, open-hearth techniques allowed for more precise temperature control, resulting in the production of better-quality steel (WSO, 2012).

In just two decades, these inventors changed the shape of modern steel industry, which was providing consistently good quality steel in high volume, consistent shapes and sizes. Steel replaced the iron in the emerging railways and all kinds of construction from bridges to buildings. Steel enabled the manufacturing of large powerful turbines and generators and helped in harnessing the power of water and steam to lead the world into the age of electric power.

By the dawn of the 20th century, steel making was a major industry and science was increasingly unlocking the mysteries of steel (WSO, 2012). The 20th century's two world wars had huge consequences for steelmaking. Like many other industries, Steelmaking was nationalized in many countries due to demands for military equipments. Steel was required for the railways and ships that carried troops and supplies. Military vehicles also relied heavily on steel.

Steel played an important role in the post-war period. After Second World War, trade and industry revived and Steel began to meet consumer demand for automobiles and home appliances. Construction activities increased with the growth of population and huge quantities of steel were required for girder sand reinforced concrete (WSO, 2012).

After 1960s, open-hearth process was replaced by the basic oxygen process in the production of steel from iron ore and by the electric-arc furnace in the production of steel from scrap. Basic oxygen steelmaking and electric arc furnaces transformed the main production processes, making them faster and more energy efficient. They allowed manufacturers to re-use scrap as input material (Spoerl, n.d.).

3.1 WORLD STEEL INDUSTRY

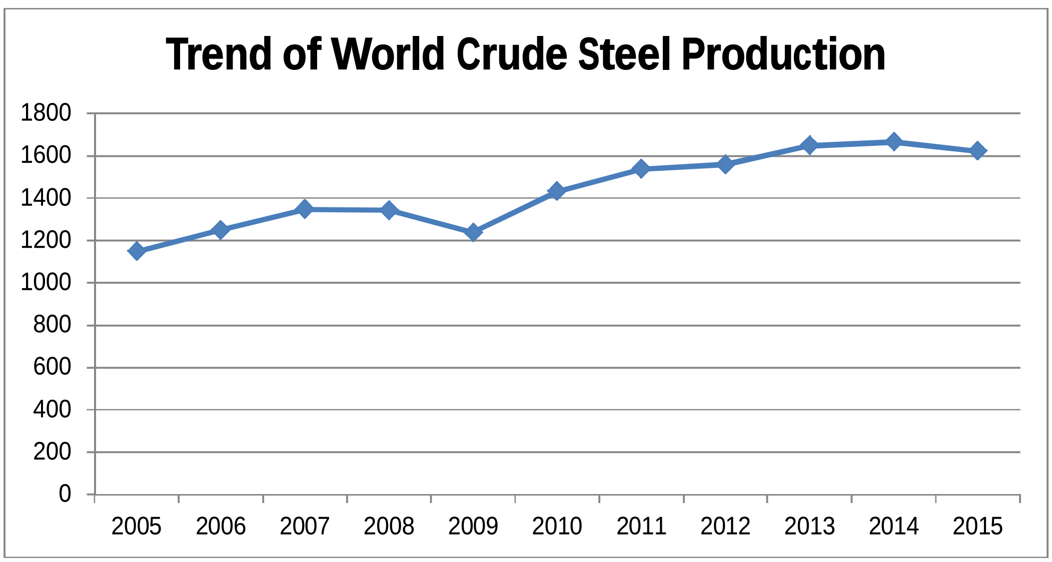
Presently, world steel industry directly employs more than two million people worldwide with two million contractors and four million people working in supporting industries. Steel is supplied to industries such as automotive, construction, transport, power and machine goods. The steel industry is at the source of employment for more than 50 million people (WSO, n.d.). Production of World crude steel has almost became double from 851 MT in 2001 to 1,665 MT for the year 2014 and its production has increased manifolds as compare to its production in 1900 (28.3

MT). World average of per capita steel consumption has increased from 150 kg in 2001 to 216.6 kg in 2014. India, Brazil, South Korea and Turkey have entered the top ten steel producers' list during the past 40 years. The housing and construction sector is the largest consumer of steel, consuming around 50% of world steel production. The steel industry globally spends more than €12 billion annually on improving the manufacturing process, new product development and future breakthrough technology.

3.1.1 World Crude Steel Production

The figure for World crude steel production reached 1,665 million tonnes (Mt) for the year 2014, an increase of 1.2% on 2013. In 2014, the Middle East, which despite of being the smallest region for crude steel production, had the most robust growth. Crude steel production in the EU (28), North America and Asia grew moderately in 2014 as compared to 2013, while the crude steel production of C.I.S. and South America have declined in 2014. Figure 3.1 shows the trend of world crude steel production during the last decade.

Figure 3.1: Trend of world crude steel production during 2005 & 2014



Source: *World Steel Association*

World crude steel production has been in increasing trend during the last decade. The year on year growth rate for crude steel production has been positive in the last decade except for two years 2008 and 2009. In 2005, World crude steel production increased by 8.0 percent as compared to the previous year while in 2006 the growth rate was 8.9 percent. In 2007, crude steel production became 1348 MT, an increase of 7.8 percent on 2006. In the years 2008 and 2009, Steel production declined in nearly all the major steel producing countries and regions. In the year 2008, there was a decline of 0.4 percent as compared to 2007, whereas in 2008 steel production declined by 7.8 percent as compared to 2008. All the major steel-producing countries and regions showed double-digit growth in 2010. Crude steel production showed a high growth rate of 15.7 percent in 2010. In 2011, world steel industry produced 1537 MT crude steel, an increase of 7.2 percent as compared to 2010. Growth rate of Steel Production declined during recent years. Steel production increased by 1.4 percent in 2012, by 3.0 percent in 2013 and by 1.2% in 2014 compared to their previous years. In the year 2015, steel production showed a negative growth rate of -2.8% compared to 2014.

3.2 INDIAN STEEL INDUSTRY

Steel has played a vital role in the development of modern human civilization. Steel plays a significant role especially in the development of developing economy. Per capita consumption of steel is used as an indicator of socio-economic development of the country as well as an indicator of standard of living of its people. Economic growth of India depends upon the growth of the Indian steel industry. Steel continues to be used in traditional sectors such as construction, housing and ground transportation, special steels has been increasingly used in engineering industries such as power generation, petrochemicals and fertilisers (Planning Commission, 2009). Currently, India is the 4th largest producer of crude steel in the world and is expected to become the 2nd largest producer of crude steel soon. The steel sector of India employs over six lakh of people & contributes nearly 2% in the country's GDP.

3.2.1 Evolution and development of Indian Steel Industry

The history of steel-making in India can be traced back to 400 BC when the Indian archers, recruited by Greek emperors, used steel tipped arrows. More than Six thousand years old archaeological finds in Mesopotamia and Egypt are made up of steel. The Iron Pillar near Qutab Minar in Delhi, built between 350 and 380 A.D and the famous Sun Temple at Konark in Orissa, built around 1200 AD, are the famous structures in India made up of steel (Ghosh, n.d.).

The use of iron in India goes back to the ancient era. Vedic literary sources such as the *Rig Veda*, the *Atharva Veda*, the *Puranas* and epics are rich with references of iron use in peace and war (SAIL, n.d.). Some of the milestones in iron and steel in Indian history are as follows.

Table 3.1: Some milestones in iron and steel in Indian history

326 BC	Porus presented Alexander 30 lbs of Indian iron
300 BC	Kautilya (Chanakya) showed knowledge of minerals, including iron ores, and the art of extracting metals in 'Arthshastra'.
320 AD	A 16-meter Iron pillar erected at Dhar, ancient capital of Malwa (near Indore).
330-380 AD	Iron pillar in memory of Chandragupta II erected near Delhi. This solid shaft of wrought iron is about 8 meters in height and has diameter from 0.32 m to 0.46 m.
13th century	Massive iron beams used in the construction of the Sun temple, Konark
16th century	Indian steel known as 'Wootz' of watery appearance used in the Middle East and Europe
17th century	Manufacture of cannons, firearms and swords and agricultural implements 1830 Suspension bridge built over the Beas at Saugor with iron from Tendulkhma (MP). JM Heath built iron smelter at Porto Nova, Madras Presidency
1870	Bengal Iron works established at Kulti
1907	Tata Iron & Steel Company formed
1953	Indian Government entered into agreement with Krupp Demag, Federal Republic of Germany to set up steel plant at Rourkela
1954	Hindustan Steel Limited formed to construct and manage three integrated steel plants at Rourkela, Durgapur and Bhilai
1956	Second Industrial Policy resolution vested the state with the exclusive responsibility for developing industries, including iron and steel, and the term Public Sector came into use for these
1960	Alloy steels plant installed at Durgapur
1965	Government of India signed agreement to establish steel plant at Bokaro
1973	Steel Authority of India Limited formed on 24th January
2006	IISCO merged with SAIL. Renamed IISCO Steel Plant.

Sources: *Steel Authority of India Limited*

In 1830, Joshua Marshall Heath, a foreigner, set up a small plant at Porto Novo on Madras Coast. But because of his expensive method and stiff competition from Bengal Iron works, it fell sick and was taken over by Bengal government and was renamed as Barakar Iron Works. Later, the plant was acquired by the Bengal Iron and Steel Company In 1889. The first notable attempt to revive steel industry in India was made in 1874 when the Bengal Iron Works (BIW) was established at Kulti in West Bengal which was taken over by Indian Iron and Steel Company (IISCO) in 1936(Gosh, n.d).

The modern steel Industry of India was started with the establishment of Tata Iron and Steel Company (TISCO) in 1907. TISCO was established by Jamsetji Nusserwanji Tata (Chand, n.d.). The company started large scale production of steel in India in 1912. By 1939, it was the largest steel plant in British Empire. After the establishments of TISCO, a few more steel companies were established. Mysore Iron and Steel Company, later renamed Vivesvaraya Iron & Steel Ltd, was established in 1923, Steel Corporation of Bengal (later renamed as Martin Burn Ltd and Indian Iron & Steel Ltd) was established in 1923 and Steel Corporation of Bengal, later renamed as Martin Burn Ltd and Indian Iron and Steel Co., was established in 1939. All these companies were in the private sector (Planning Commision, 2009).

In 1918, Indian Iron and Steel Company (IISCO) was established. It started production of pig iron at Burnpur in 1922.The Bengal Iron Works went into liquidation and merged with IISCO. The Steel Corporation of Bengal (SCOB) formed in 1937, started producing steel in Asansol. Later, SCOB was merged with IISCO in the year 1953(Gosh, n.d.).

In 1947, when British colonial rule ended and India became independent, there were only three steel plants in India (the Tata Iron & Steel Company, the Indian Iron and Steel Company and Visveswaraya Iron & Steel Ltd)with a few electric arc furnace-based plants. Till 1947, India had a small steel industry in the country with a production capacity of about 1 million tonne (Ministry of steel, 2013).

The first industrial resolution in free India was adopted in 1948.The resolution officially accepted the principle of mixed economy. Under New Industrial Policy 1948, new undertakings in the iron and steel industry were reserved for the public sector without disturbing the existing private players. India adopted its constitution in 1950 and planning commission was also constituted in the same year. The Industrial (Department and Regulation) Act (IDR Act), enacted in 1951, empowered the Government to take necessary steps to regulate the pattern of industrial development in the country and paved the way for the Industrial Policy Resolution of 1956. Industrial Policy Resolution 1956 was based on the Mahalanobis Model, which emphasized on heavy industries and process of industrialization as the means to achieve socialistic pattern of development. The Central government assumed direct responsibility for industrial development.

Then Prime Minister Jawaharlal Nehru, a believer in socialism, formed a government owned company named Hindustan Steel Limited (HSL) and set up three steel plants in 1950s. During the first three Five-Year Plans between 1952 and 1970, Government set up large integrated steel plants at Bhilai, Durgapur, Rourkela and Bokaro. The first plant was set up at Rourkela in Orissa. The second came up at Bhilai in Madhya Pradesh and the third at Durgapur in West Bengal. Each of these three plants had an initial production capacity of one million tonne ingot. Durgapur was followed by establishment of a steel plant at Bokaro in Bihar. The onward march of Indian steel did not stop at Bokaro. The fifth public sector steel plant was set up at Visakhapatnam in Andhra Pradesh.

- ***New Industrial policy 1948 & Industrial policy resolution 1956***

In new industrial policy of 1948 and industrial policy resolution of 1956, emphasis was given on socialistic pattern of society and therefore iron and steel industry was imposed with certain controls (WBIDC, 2010). The steel industry remained in control regime, till the economic liberalization of 1990s.

1. Capacity control measures,
2. Dual pricing System,
3. Quantitative restrictions and high tariff barriers,
4. Railway freight equalization,
5. Control on import of inputs.

In a decade, crude steel production in India grew to nearly 15 million tonnes from only 1 million tonne in 1947 and India became 10th largest producer of steel in the world. But the steel industry of India could not sustain the trend of steel production from the late 1970's onwards and the economic slowdown adversely affected the growth of the Indian steel industry. In 1991-92, the control regime was replaced by liberalization and deregulation in the form of New Industrial policy 1991.

- ***New industrial policy 1991***

The provisions of the New Economic Policy of 1990's impacted the steel industry of India in following ways (Ministry of Steel, 2006):

1. Iron and steel industry was removed from the list of industries reserved for the public sector and was exempted from the provisions of compulsory licensing under the Industries (Development and Regulation) Act, 1951.
2. Iron and steel industry was included in the list of 'high priority' industries for automatic approval for foreign equity investment up to 51% which has increased to 100% since then.
3. Pricing and distribution of steel were deregulated, ensuring the priority for meeting the requirements of small scale industries, exporters of engineering goods and North Eastern Region, besides strategic sectors such as Defense and Railways.
4. Iron and steel import was liberalized by removal of import licensing, foreign exchange release and lowering of import duty.
5. Export of iron and steel items has also been freely allowed.
6. Import duty on capital goods and raw materials for steel production were reduced.
7. Freight equalization scheme was withdrawn.

After the economic reform, Indian economy opened up new channels for steel manufacturers. Globalization of the economy helped them in procuring raw materials and other inputs at competitive rates from overseas markets and in finding new markets for their products. It also helped in understanding the global operations/techniques of steel manufacturing. Domestic players enhanced their efficiency to become internationally competitive. It is also good for the consumers as the steel consumer can now choose items from domestic and imported manufactured steel.

With the rapid growth of Indian steel industry and its integration with global industry there was a need for a roadmap of growth and development of Indian steel industry which induced the government to introduced National steel policy(NSP) in November 2005.

- ***National Steel Policy (NSP) 2005***

The main aim of National Steel Policy was to make Indian steel industry as self reliant internationally competitive industry and to established Indian steel industry as a modern and efficient steel industry that can cater diversified steel demand. NSP 2005 aimed to remove the bottlenecks in the availability of inputs, investment in research & development and development of infrastructure. The policy envisages steel production to reach at 110 MT by 2019-20 with annual growth rate of 7.3 percent (Ministry of steel, 2005).

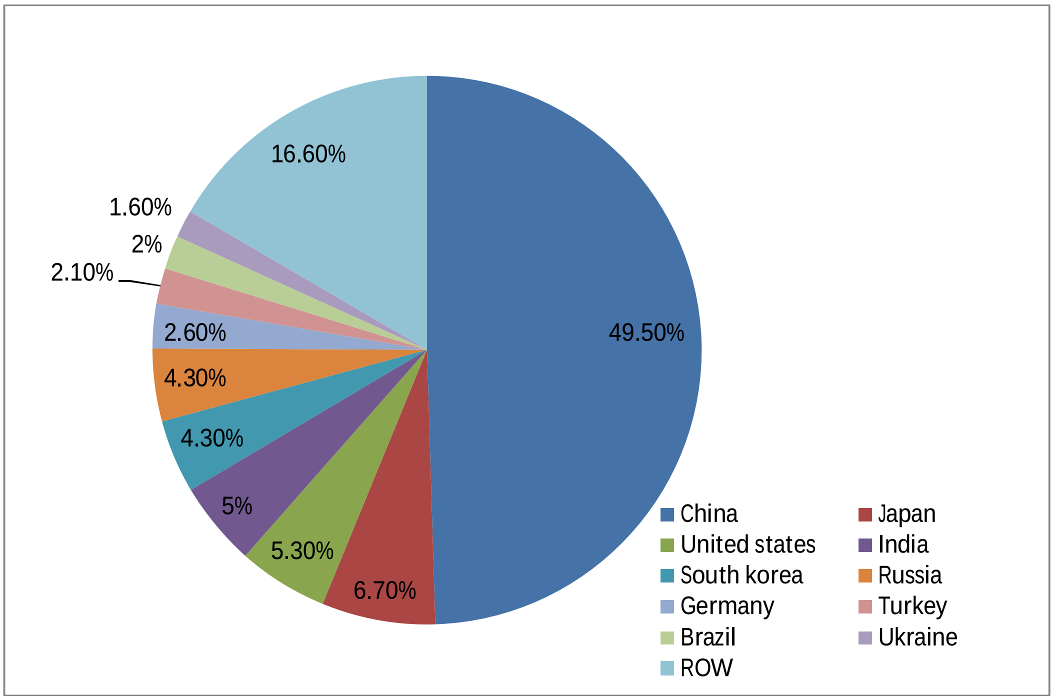
- ***National Steel Policy 2012***

The National Steel Policy 2005 was formulated when the Indian steel industry was moving with high growth rate showing promises of a significant resurgence. However, the Indian economy experienced a paradigm shift with the actual performance of the economy with the Indian steel industry surpassing the projected levels of performance. Steel consumption grew by 10% per annum from 2005-06 to 2011-12 with growth in the production at an annual rate of 7.8% during the same period thereby surpassing the NSP 2005 projections by a significant margin. Therefore, National Steel Policy was needed to be dynamic. Taking into consideration the changing needs of the industry in view of significant changes in the domestic and global economic environment, the Government of India decided to formulate National Steel Policy 2012 (NSP 2012) to reach crude steel production capacity level of 300 million tonnes by 2025-26 and to meet the domestic demand fully and to achieve a projected production level of 275 million tonnes by 2025-26 (Ministry of Steel, 2012).

3.2.2 Global status of Indian Steel Industry

Indian Iron and steel industry contributes appreciably to overall growth and development of the economy. Indian Steel Industry today directly contributes two percent of India's Gross Domestic Product (GDP) and its weightage in the official Index of Industrial Production (IIP) is 6.2 per cent (Working committee report 2011-17). Globally, India has become the world's fourth largest producer of crude steel preceded only by China, Japan and USA.

Figure 3.2: Share of India in world crude steel production in 2014



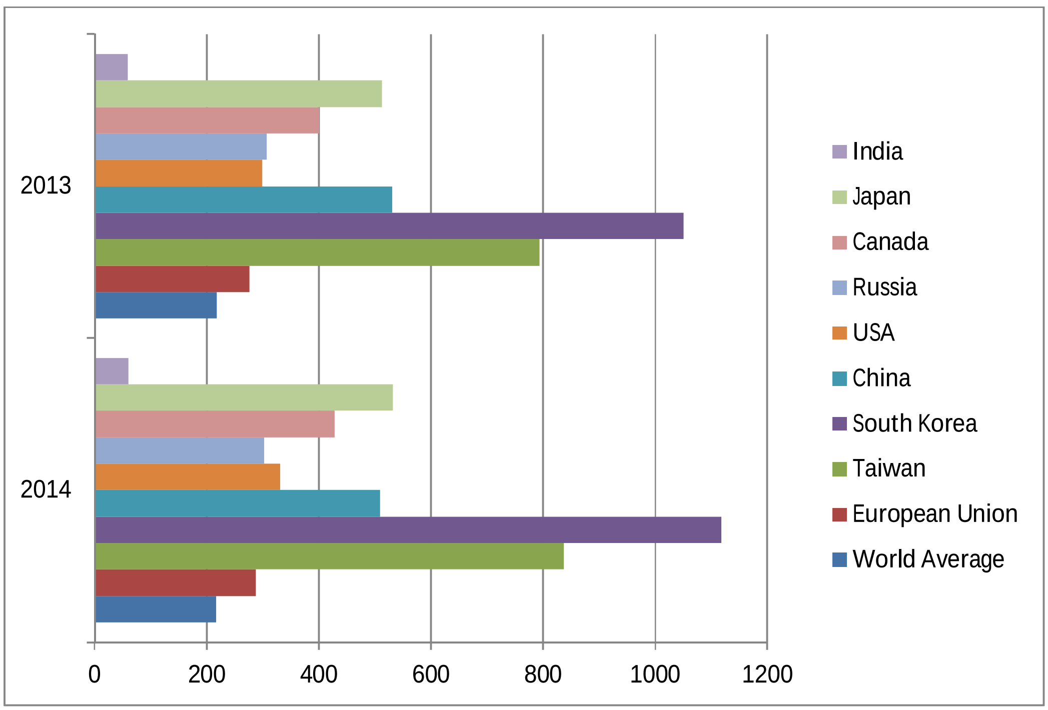
***Source:** World Steel Association*

***Noted:** ROW = Rest of the world*

Figure 3.2 shows the share of top ten countries in world crude steel production in 2014. The countries like China, Japan, India and South Korea are the top steel producers among the Asian countries. China has been the largest crude steel producer in 2014 with a share of 49.50 % in world crude steel production while India was the fourth largest producer of crude steel in 2014 with a share of 5.0 % in world crude steel production preceded by South Korea (16.60 %), Japan (6.7 %) and USA (5.30 %).

Comparing world crude steel production in 2013 and 2014 *(see appendix 1)*, annual crude steel production for Asia was 1,132.3 MT in 2014, an increase of 1.4% compared to 2013. It can be seen that in 2014, crude steel production of China (822.7 MT) was increased by 0.9% compared to 2013. In 2014, crude steel production of Japan (110.7 MT) was up by 0.1% compared to 2013. Crude steel production of US reached 88.3, an increase of 1.7% on 2013. In 2014, production of crude steel in India (83.2 MT) was up by 2.3% compared to 2013. South Korea produced 71.0 MT Crude steel in 2014, an increase of 7.5% compared to 2013. Crude steel production of Russia (70.7 MT) was increased by 2.6% in 2014 compared to its production in 2013. The Crude steel production of Germany was increased by 0.7% in 2014 compared to 2013. Turkey, Brazil and Ukrain are among the major producing countries that showed decline in the production of crude steel in 2014.

Figure 3.3: Country wise per capita steel consumption in 2013 & 2014



Source: *World Steel Association*

As depicted in figure 3.3, *(appendix 1)* despite of being fourth largest producers of crude steel in the world, India lagged behind other major steel producing countries in terms of per capita consumption of steel. In 2014 per capita consumption of steel in

India was only 59.4 kg against the world average of 216.6 kg. According to World steel Association, Global per capita steel consumption was 216.6 kg in 2014, a decline of 0.6 percent compared to per capita steel consumption in 2013 (217.8 kg). Among larger economies, China's per capita steel consumption was 510.0 kg in 2014 as compared to 530.6 kg in 2013 while EU showed an increase of 4.3 percent in per capita steel consumption in 2014 as compared to 2013. Per capita steel consumption of Taiwan was 837.1 kg in 2014, an increase of 5.6 percent compared to 2013. South Korea with a per capita consumption of 1118.8 kg, showed a 6.5 percent increase in per capita steel consumption and remains at top in per capita steel consumption in 2014. South Korea consumed more than double of China's per capita steel consumption in 2014. USA showed most robust growth in per capita steel consumption in 2014 (10.8%) while Canada per capita consumption (428.5kg) was up by 7.0 percent in 2014 compared to 2013. Per capita steel consumption of Russia was 302.8 kg, a decline of 1.2 percent compared to 2013. Japan's per capita steel consumption was 531.7 kg in 2014. India's per capita steel consumption was 59.4 kg in 2014, a growth of 600 gm compared to 2013. In 2014, India's steel consumption grew by just 1.0 percent compared to 2013 due to slow growth in domestic economy.

3.2.3 Steel production and consumption in India

Crude steel production in India showed high growth rate during 10th five year plan. The first year of the 11th Plan i.e. 2007-08 had also been a year of high growth for the industry, but because of global economic crises, the industry could not maintained high growth rate in subsequent years. Steel Industry, like other manufacturing sectors, is market driven and therefore, has affected by the adverse global market conditions. But with timely policy interventions and stimulus of fiscal and monetary packages, industry showed sign of recovery in production and consumption (Working committee report 2012-17).

Table - 3.2 depicts production of finished steel for sale in India. Production for sale of total finished steel (alloy + non alloy) was 85.054 MT in 2013-14 as compared to 81.68 MT in 2012-13. The share of secondary producers (major and other producers) was 85.2 percent in 2013-14. This high share of secondary producer in total finished steel production for sale was mainly due to availability of raw materials, expansion of capacities and emergence of new units in these segments. Production of finished steel for sale has been continuously increasing in India.

Table 3.2: Total production of steel in India (alloy and non-alloy)

(in million tonnes)

Year	Main producer	Secondary producer	Less IPT/Own Consumption	Total (Finished Steel)	% Share of Secondary Producers
2003-04	15.383	27.966	2.640	40.709	60.8
2004-05	15.824	31.041	3.352	43.513	71.3
2005-06	16.413	34.809	4.656	46.566	74.8
2006-07	17.614	40.047	5.132	52.529	76.2
2007-08	18.020	43.332	5.277	56.075	77.3
2008-09	17.216	46.229	6.281	57.164	80.9
2009-10	18.038	51.093	8.507	60.624	84.3
2010-11	18.407	57.890	7.676	68.621	84.4
2011-12	17.978	66.426	8.708	75.696	87.8
2012-13	19.244	70.376	7.940	81.680	86.2
2013-14	21.099	72.442	8.487	85.054	85.2

Source: *Various Annual reports, Ministry of Steel,(GOI)*

In 2003-04, its production was 40.709 MT with 60.8 percent share of secondary producer in total finished steel production. In 2005-06, production increased to 46.566 MT compared to 43.513 MT in 2004-05. In 2006-07, total finished steel production reached 52.529 MT and in 2007-08, it increased to become 56.075 MT. Further, production of finished steel for sale increased to become 57.164 MT in 2008-09 and 60.624 MT in 2009-10. In 2010-11, total finished steel production for sale was 68.621 MT which further rose to 75.696 MT in 2011-12.

Table 3.3: Crude Steel Production in Public and Private Sector in India

(in million tonnes)

Year	Public sector	Private sector	Total production	Share of public sector
2003-04	15.788	22.939	38.727	41 %
2004-05	15.912	27.525	43.437	36 %
2005-06	16.964	29.496	46.46	36 %
2006-07	17.003	33.814	50.817	33 %
2007-08	17.09	36.77	53.86	32 %
2008-09	16.37	42.07	58.44	28 %
2009-10	16.71	49.13	65.84	25 %
2010-11	16.99	53.68	70.67	24 %
2011-12	16.48	57.81	74.29	22 %
2012-13	16.48	61.94	78.42	21 %
2013-14	16.77	64.92	81.69	21%

Source: *Various Annual Reports, Ministry of Steel, (GOI)*

The table 3.3 highlights the total production of crude steel in India by both private and public sector. Table 3.3 shows increasing trend in the production of crude steel in India during last decades. The production of crude steel in India has increased from 38.727MT in 2003-04 to 81.69 MT in 2013-14. But there has been a continuous decrease in share of crude steel production of public sector during the last decade. Public sector produced 15.788 MT of crude steel with market share of 41 percent in 2003-04. The production of crude steel by public sector has increased to become 16.77 MT in 2013-14 but the share of public sector in total production of crude steel has reduced to 21 percent in 2013-14. Hence, it can be concluded that private sector of steel industry in India is currently playing an important role in production and growth of steel industry in India and the share of public sector in crude steel production has declined compared to the private sector.

Table 3.4: Installed capacity, Production and utilization of capacity of crude steel in India

Year	Capacity (in million tonnes)	Production (in million tonnes)	Capacity utilization (in Percentage)
2004-05	47.995	43.437	88
2005-06	51.171	46.460	91
2006-07	56.843	50.817	89
2007-08	59.85	53.86	90
2008-09	66.34	58.44	88
2009-10	75.00	65.84	88
2010-11	80.36	70.67	89
2011-12	90.87	74.29	82
2012-13	97.02	78.42	81
2013-14	101.02	81.69	81

Sources: *Various Annual reports, Ministry of Steel,(GOI)*

Crude steel production and capacity utilization are given in the table 3.4. The capacity utilization rate is a key indicator of the steel industry's health. Capacity utilization means actual production as compared to the maximum production possible using existing plants. Crude steel production has shown a sustained rise since 2004-05 along with capacity. India has become the fourth largest producer of crude steel in the world in 2014, based on ranking released by World Steel Association. This growth has been driven by capacity expansion from 47.995 million tonnes in 2004-05 to 101.02 million tonnes in 2013-14. The production of crude steel in India shows constant rise with the rise in installed capacity of production. Crude steel production was 43.437 MT in 2004-05 with installed capacity of 47.995 MT, utilization of 88 percent of capacity. In 2005-06, crude steel production rose to 46.46 MT with 51.171 MT capacity and 91 percent capacity utilization. In 2006-07, capacity utilization ratio fell to 89 percent but crude steel production rose to 50.817 MT with a production capacity of 56.843 MT. In 2007-08 crude steel production increase to 53.86 MT with installed capacity increase to 59.75 MT utilizing 90 percent capacity. In 2008-09 production reached to 58.44 MT with 66.34 MT installed capacity but capacity utilization ratio fell to 88 percent. In 2009-10, capacity utilization ratio was at same level of 88 percent, but crude steel production increased to 65.84 MT and capacity increased to 75.0 MT. In 2010-11 production capacity reached the level of 80.36 MT and India produced 70.67 MT of crude steel utilizing 89 percent of capacity. In 2011-12, capacity utilization rate fell to 82 percent but capacity and production increased to 90.87 MT and 74.29 MT respectively. In 2012-13, capacity utilization rate further fell to the level of 81 percent but production capacity increased to 97.02 MT producing 78.42 MT of crude steel.

Real Consumption of steel is obtained from apparent consumption (i.e. production + imports – exports +/- variation in stocks) of total finished steel after adjusting for double counting in flat products (Ministry of steel, GOI). The year-wise trend in real consumption of total finished steel is shown in table 3.5.

The apparent consumption of finished steel is given in table 3.5. Apparent consumption of steel in India has been in increasing trend during the last decade. Domestic Real consumption of steel was 36.38 MT in 2004-05. Domestic real steel consumption was grew by 13.88 percent in the year 2005-06 compared to previous year to become 41.43 MT. In 2006-07, it further grew by 12.91 percent with a consumption of 46.78 MT. In 2007-08, real steel consumption was 52.12 MT, an increase of 11.42 percent on previous fiscal year.

Table 3.5: Apparent Consumption of Finished Steel in India

(in million tonnes)

Year	Production for sale	Import	Export	Apparent consumption	Growth rate (Consumption)
2004-05	38.99	2.29	4.7	36.38	9.84
2005-06	42.16	4.31	4.81	41.43	13.88
2006-07	49.58	4.93	5.24	46.78	12.91
2007-08	56.08	7.03	5.08	52.12	11.42
2008-09	57.16	5.84	4.44	52.35	0.44
2009-10	60.62	7.38	3.25	59.34	13.35
2010-11	68.62	6.66	3.64	66.42	11.93
2011-12	75.69	6.86	4.59	71.02	6.92
2012-13	81.68	7.93	5.37	73.48	3.46
2013-14	87.67	5.45	5.98	74.09	0.83

Source: *Various Annual reports ministry of steel (GOI)*

In 2008-09, domestic real consumption grew just by 0.44 percent to become 52.35 MT. The low growth rate in 2008-09 was due to world economic crises that started in October 2008. With the recovery from the crises, domestic steel consumption increased by 13.35 percent in 2009-10 and reached the level of 59.34 MT. Further, it increased by 11.93 percent in 2010-11 to become 66.42 MT. Domestic real steel consumption's growth started to decline in 2011-12 and India's steel consumption grew by just 0.6% in 2013-14, lowest in five years, to become 73.89 MT. The growth in real steel consumption was mainly impacted by a slower expansion of the domestic economy .

3.2.4 Export and Import of steel from India

Iron and steel products are importable freely as per the extant policy. Advance licensing scheme allow duty free import of raw material for export. Iron and steel are freely exportable. Duty entitlement pass book scheme was introduced to facilitate exports. Under this scheme exports based on notified entitlement rate, are granted due credit which would entitle them to import duty free good. The benefit on export of various categories of steel items scheme is currently applicable for steel exports.

Steel imports have increased in India due to deregulation and reduction in import duties on steel imports, surge in domestic demand and reduction in price differential between imported steel and domestic steel. Import volumes have been fluctuating during the last decades. Liberalization and free trade policy helped in growth of steel exports from India. Steel exports from India were declined during 2008 and 2011 due to decrease in demand of steel globally.

Table 3.6: Export and Import of steel from India

(in million tonnes)

Year	Import	% Growth	Export	% Growth	Net
2004-2005	2.29		4.70		Export
2005-2006	4.31	88.2	4.81	2.3	Export
2006-2007	4.93	14.4	5.24	8.9	Export
2007-2008	7.03	42.6	5.08	-3.1	Import
2008-2009	5.84	-16.9	4.44	-12.6	Import
2009-2010	7.38	26.4	3.25	-26.8	Import
2010-2011	6.66	-9.7	3.64	12.0	Import
2011-2012	6.86	3.0	4.59	26.1	Import
2012-2013	7.93	15.6	5.37	17.0	Import
2013-2014	5.45	-31.2	5.98	11.4	Export
2014-2015	9.32	71.0	5.59	-6.5	Import

Source: *Various Annual Reports, Ministry of Steel (GOI)*

Table 3.6 explains imports and exports of steel in India. India has been a net importer of steel for most of the years during last decades. From 2004-05 to 2006-07, India has been a net exporter of steel as during these years steel exports was more than steel imports. From 2007-08 to 2014-15, India has been a net steel importer except for the year 2013-14. During these years India's import of steel was more than its exports. In 2007-08, India's steel imports stood at 7.03 MT, an increase of 42.6 percent as compared to 2006-07 while exports stood at 5.08 MT, a decrease of 3.1 percent on 2006-07. In 2008-09, a decline of 16.9 percent and 12.6 percent were recorded in steel imports and exports, respectively. In 2009-10, India's steel imports increased to 7.38 MT but exports decline to 3.25 MT. In 2010-11, total steel imports were 6.66 MT, a decline of 9.7 percent on previous fiscal while the exports stood at 3.64 MT. In 2011-12, steel imports in the country became 6.86 MT and exports became 4.59 MT. In 2012-13, steel imports in India became 7.93 MT and its export stood at 5.37 MT. India became net steel exporter in 2013-14 after a period of six years. Total steel exports by India during fiscal 2013-14 stood at 5.98 MT as against imports of 5.45 MT. About 11.4 percent higher exports and 31.3 percent decline in imports helped India to become net exporter of steel. Higher exports were driven by mismatched demand supply situation in the country and imports were lower mainly due to slowdown in the domestic economy.

3.2.5 Prospects for Demand and supply of steel in India

The Indian steel industry entered into a new development stage from the year 2007-08 with rising demand for steel. Because of Rapid rise in production of steel, India is now the 4th largest producer of crude steel and the largest producer of sponge iron or DRI in the world (MOS**,** 2015**).** As per the forecast of World Steel Association, India's steel demand is expected to grow by 3.4% to 76.2 Mt, following a growth of 1.8% in 2013. Further, structural reforms and improving confidence will support a 6% growth in Indian steel demand in the year 2015 but prominent inflation and fiscal consolidation will remain key difficulty for the projected growth rate (WSO, 2014).

According to the report of the Working Group on Steel for the 12th Five Year Plan, many factors can raise the per capita steel consumption in the country like an estimated infrastructure investment of nearly a trillion dollars, a projected growth of manufacturing from current 8% to 11-12%, increase in urban population to 600 million by 2030 from the current level of 400 million, emergence of the rural market for steel currently consuming around 10 kg per annum. Total domestic demand for steel will increase from 65.61 million tonnes in 2010-11 to 113.3 million tonnes in 2016-17 while the production will increase from 62.27 million tonnes in 2010-11 to 115.3 million tonnes in 2016-17 (Ministry of Steel, 2011). In National Steel Policy 2005, production was projected to reach 110 million tonnes by 2019-20 (Ministry of steel, 2005). However, the National Steel Policy 2005 was formulated when the Indian steel industry was moving with high growth rate but in later years the Indian economy experienced a paradigm shift with the actual performance of the economy with Indian steel industry surpassing the projected levels of performance. Therefore, the Government of India, decided to formulate National Steel Policy, 2012 (NSP 2012) to reach crude steel capacity level of 300 million tonnes by 2025-26 to meet the domestic demand fully and a projected production level of 275 million tonnes by 2025-26 (Ministry of Steel, 2012). Based on the assessment of the current ongoing projects, both in greenfield and brownfield, the Working Group on Steel for the 12th Five Year Plan has projected that domestic crude steel capacity in the county is likely to be 140 Mt by 2016-17 and has the potential to reach 149 Mt if all requirements are adequately met. According to the Ministry of Steel (2015), during 12th Five Year Plan (2012-2017), domestic demand of total finished steel is likely to grow at an annual average growth rate of over 10% as compared to the average annual growth rate of 8% between 1991-92 and 2010-11.

3.2.6 Major players in steel industry in India

3.2.6.1 Public Sector

- ***Rashtriya Ispat Nigam Ltd. (RINL)***

Rashtriya Ispat Nigam Ltd. (RINL) is the corporate entity of Visakhapatnam Steel Plant popularly known as Vizag steel. It is a Navratna Public sector enterprise. It is the first shore based integrated steel plant located at Visakhapatnam in Andhra Pradesh. A market leader in long steel products, it is catering the need of construction, automobiles, engineering and fabrication sectors. The plant, with a capacity of producing 3 Million tonnes of steel per annum, was commissioned in 1992. Now the company is about to increase its capacity to 6.3 million tonnes per annum. The plant adopted all international standards for energy saving and pollution control measures. From the beginning of its operation, VSP has been recognized in the domestic as well in international markets because of its superior quality of products. A pioneer in the steel industry, The company has been accredited all the three International standards certificates, ISO 9001:2000, ISO 14001: 1996 and OHSAS 18001: 1999. It is the first Indian integrated steel plant which is certified with ISO 50001 standards for Energy Management system. The Ministry of Steel, Govt. of India gave the prestigious status of Mini Ratna to the company in 2006 and RINL has prepared a road map to expand the plant‘s capacity up to 16 million tonnes per annum in phases. The plant has been Operating at high level of operational efficiency and continuously earning profit for last several years. The company is working as a good corporate citizen and has contributed substantially for the development of the region.

- ***National Mineral Development Corporation Limited (NMDC Ltd)***

NMDC Ltd is a government of India fully owned public enterprise. It was founded in 1958 under the administrative control of the ministry of Steel, Government of India. Currently, it produces around 30 million tonnes of iron ore from three fully mechanized mines that is Bailadila Deposit-14/11C, Bailadila Deposit-5, 10/11A in Chhattisgarh State and Donimalai Iron Ore Mines in Karnataka State with ISO 9001: 2008 - QMS Certification for all its iron ore mines and R&D Centre, ISO 14001:2004 - EMS Certification for all its production mines and OHSAS 18001:2007 - OHMS Certification for all its production mines. NMDC is India's single largest iron ore producer. NMDC has been accorded the status of schedule-A public sector company. It has been categorized as *"NAVRATNA"* Public Sector Enterprise in 2008 by the Department of Public Enterprises for its growing status and consistent excellent performance. Bailadila complex has world's best grade of hard lumpy ore having more than 66% iron content with the best physical and metallurgical properties required for steel making. NMDC had developed many mines like Kiriburu, Meghataburu iron ore mines in Bihar, Khetri Copper deposit in Rajasthan, Kudremukh Iron Ore Mine in Karnataka, Phosphate deposit in Mussorie, some of which were later handed over to other companies in public sector and others became independent companies. NMDC is presently producing about 22 million tonnes of iron ore from its Bailadila sector mines and 7 million tonnes from Donimalai sector mines. Bailadila is an important supplier of raw material to Essar steel, ISPAT industries, Vikram Ispat and Visakhapatnam Steel Plant. NMDC is increasing production capacity of existing mines and opening up new mines to meet the expected increase in demand, the production capability would increase to 50 million tonnes (approx.) per year in coming years. Apart from iron ore NMDC is developing Magnesite mine in Jammu and Arki Lime Stone Project in Himachal Pradesh. NMDC is also developing a 3 million tonnes per annum steel plant at Jagdalpur and 2 pellet plants at Donimalai with capacity 1.2 mtpa and at Bacheli with capacity 2 mtpa. NMDC has also acquired Sponge Iron India Limited for expansion to produce billets. NMDC also plans to go for other minerals like Coal, Diamond, gold etc. NMDC has set a Global Exploration Centre at Raipur, Chhattisgarh for the exploration activities. A Wind mill project of 10.5MW capacity has been completed in Karnataka by NMDC as renewable energy resources. The CSR Policy of NMDC has a holistic triple bottom line approach benefitting the company and the society with CSR initiatives in the areas of Medicare, education, skill training, infrastructure, drinking water, etc. Department of Public Enterprises (DPE), Ministry of Heavy Industries and Public Enterprises, New Delhi has suggested the PSEs to follow NMDC CSR model for effective CSR activities.

- ***Ferro Scrap Nigam Limited (FSNL)***

FSNL was established in the year 1979 as a government of India Company. The main business of the company is recovering and processing of scrap in the integrated steel plants. FSCL was originally an American company named Heckett Engineering which commenced its operation in 1956. Later in 1956 because of foreign exchange regulation act, a new company Ferro Scrap Nigam Limited was founded which take over the business of Heckett engineering with 60% of the equity contributed by MSTC and 40% by Heckett engineering. FSNL became wholly owned subsidiary of MSTC in 2002. At present the company has ten steel plants in India. It has diversified into marketing of heavy earthmoving equipment products, R & D consultancy, mining and civil structural contracts, central workshops and renewable energy to make company globally competitive.

- ***Kudremukh Iron Ore Company Ltd (KIOCL Ltd)***

KIOCL Ltd was established in the year 1976. It is a 100% export oriented unit under the ministry of steel, government of India. The Company has its registered office in

Bangalore. It also has status of Mini Ratna. Company has an iron oxide pellet plant and a blast furnace unit in Mangalore, Karnataka. The company is in the business of producing and exporting high quality iron oxide pellets and supply of pig iron for domestic market. It is ISO-9001:2008 certified for quality of its product and ISO-14001:2004 certified for occupational health and safety management system. The annual capacity of the pellet plant is to produce 3.5 million tonnes of pellets and blast furnace unit produces 2.16 lakh tonnes of foundry grade pig iron. It has awarded with MOU award for the year 1999-2000 and 2000-01 for achieving excellent rating in achieving MOU targets for these years. The company has been conferred with many awards in different fields like environmental conservation and rational utilization of natural resources, export best performance, excellent organization, energy conservation, pollution control etc, the company also contribute to the development of the society by its CSR activities like socio-economic, educational and health initiatives. The company has many future projects for implementation for growth of the company like an integrated steel plant and mining lease in Karnataka, solar power generation, etc

3.2.6.2 Private sector

- ***Tata Steel Ltd.***

Tata steel was established in 1907 by Jamshedji Ratan Tata. It has it's headquarter in Jamshedpur in Jharkhand. Tata steel group is among the top ten steel manufacturers in the world. Currently it is operating in more than 26 countries and has its commercial presence in 50 countries. It is the second most geographically diversified steel manufacturer in the world. The company has a capacity of producing over 29 million tonnes of crude steel per annum. The company has more than 80,000 employees working with it across five continents. The Tata steel group had a turnover of Rs. 148614 crores in financial year 2014 and has been successful in securing a place in fortune 500 company. The group has the vision to be the world's industry standard in value creation and corporate citizenship. With its subsidiaries, joint ventures and associates, Tata steel groups have expanded its operation in many countries. The company has manufacturing units and marketing networks in Europe, Southeast Asia and Pacific Rim countries with bigger manufacturing facilities in India, The United

Kingdom, The Netherland, Thailand, Singapore, China and Australia. The companies within the Tata steel Group are Tata Steel Limited India, Tata Steel Europe Limited, Tata Steel Singapore and Tata Steel Thailand. Tata Steel India awarded The Deming application prize for 2008 for excellence in total quality management and in 2012 awarded with The Deming Grand prize 2012, instituted by Union of Japanese scientists and engineers and Tata steel India became first integrated steel plant outside Japan to be awarded with these Prizes.

- ***Essar Steel Ltd.***

Essar steel is a global integrated steel producer founded in 1998. Essar Steel is one of the leaders in India and abroad in the steel sector. It is part of the Essar Group with its head office in Mumbai. It has a capacity of 14 million tonnes per annum. It has a strong presence in steel consuming market of Asia and North America. It is operated in four countries, it operates in India with a integrated facility of 10 million tonnes per annum, it operates in Canada with a steel plant of capacity of 4 million tonnes per annum, it has a Taconite plant under execution in USA with 7 million tonnes per annum capacity and it has a 0.4 million tonnes per annum downstream complex in Indonesia. Essar Steel India is an integrated steel manufacturer. It has a capacity of producing 10 million tonnes per annum. Essar steel produces over 300 grade of steel according to the quality standards of international certification agencies like API, ABS and NACE etc. also Information technology is used extensively in the operations to ensure consistent quality of its product. The steel plant located at Haziro has modern infrastructure like a power plant and a port that can handle 30 million tonnes cargo annually. Essar steel has set up a 1.5 million tonnes per annum plate mill and a 0.6 million tonnes per annum pipe mill to add value to its products. Essar steel customized products catering to a variety of industry segments with one of the largest steel processing and distribution network located at many industrial hubs. Essar steel has been awarded with ISO: 9001:2000, ISO9002, ISO 1400, ISO27001, and OHSAS18001:1999 etc. Essar steel gives due importance to design and operation and has become a zero waste company. It has received recognition from reputed institutions like centre for science and environment, water digest, world steel association etc

- ***JSW Steel Ltd.***

JSW steel Ltd is one of the leading private sector steel producers in India. JSW group acquired Piramal steel Ltd which operated a mini steel mill at Tarapur in Maharashtra and set up Jindal iron and steel company with its first steel plant at Vasind near Mumbai and started manufacturing steel in 1982. Jindal vijaynagar steel was set up in 1994. In next two decades it expanded and Jindal iron and steel company merged with Jindal Vijaynagar steel Ltd. in 2005. Now JSW steel has plants in six locations in India, these locations are Vijaynagar in Karnataka, Salem in Tamil Nadu, and Tarapur, Vasind, Kalmeshwar and Dolvi in Maharashtra. Plants in Karnataka, Tamil Nadu and Maharashtra have a combined capacity of 14.3 million tonnes per annum, and it has an objective of expanding its capacity to 40 million tonnes in next decades. JSW steel has a plate and pipe mill in the US and the company has acquired mining assets in Chile, US and Mozambique. It has also formed joint venture for setting up a steel plant in Georgia and it has tied up with JFE steel corporation Japan for producing high grade Automotive steel.JSW is recognized worldwide for its high-end value added steel which is the result of The strong focus on innovation and R & D.

- ***Bhushan Steel***

Bushan steel Ltd was founded by Brij Bushan Singal in the year 1987 with its first plant at Sahibabad in Uttar Pradesh. Bushan Steel Ltd formerly known as Bushan Steel & Strips Ltd is a well known leading and prominent player in the steel industry all over the world. With more than two decades of experience in steel manufacturing, it is now third largest secondary steel manufacturing company in India. Currently it has an annual production capacity of around 2 million tonnes. Bushan Steel Ltd has three manufacturing units –Sahibabad unit in Uttar Pradesh, Khopoli unit in Maharashtra, and Meramandali unit in Orissa. The company produces a range of products such as cold rolled closed annealed, galvanized coil and sheet, high tensile steel strapping, colour coated coils etc. BSL has emerged as the country's only cold rolled steel plant with an independent line for producing cold rolled coil. BSL focuses on acquiring latest technology and know-how, and provides best quality of products to its customer.

- ***Uttam Steel Ltd.***

Uttam Steel Ltd was founded by Mr Rajinder Miglani in the year 1985. Uttam Galva Steels Limited is among the largest producers of cold rolled steel (CR) and galvanized steel (GP) in Western India. The Company procure hot rolled steel (HR) and processes it into CR and further into GP and Colour Coated Coils. It specializes in making Galvanized coils ultra thin sheets, of as low as 0.13mm of thickness. In the fiscal 2012-13, it had net revenues of Rs.59111 million (US $ 1087 millions) and net income of Rs 616 million (US $ 11 millions). More than 50% of the Company's products are currently exported to 132 countries worldwide and it has a customer base in many advanced markets such as Australia, France, Germany, Greece, UK and the USA to name a few. The Company has established itself as a major supplier of CRCA to Manufacturers of automobiles, white goods, general engineering and drums & barrels segment in India. The Company is also a large supplier of galvanized coils and sheets to the construction industry. The Company plants are located at Khopoli, near Nhavasheva and Mumbai ports in Maharashtra. A close proximity to the ports provides the Company the advantage of lowering its transportation costs. The Company's domestic sales are also within the radius of 500 km from its manufacturing facilities to domestic companies. The Company has expanded and modernized its operations at Khopoli which have increased its cold rolling capacity to 1 million MT per annum as of March 2010. The Company has also increased its GP capacity to 750,000 MT per annum as of March 2010. The Company has also added a new colour coated line (Uttam Spectrum) with a capacity of 90,000 MT per annum as of March 2010. The Company has an entire range of cold rolling Reversible mills i.e. 20-Hi, 6-Hi, 4-Hi and newly commissioned twin stand 6-Hi mill. It is now in a position to process HR coils of different grades, thicknesses and widths and is able to meet virtually the entire thickness/width range of CR/GP/GC coils for various end-use sectors. A significant portion of the Company's CR coils and GP/GC, coils/sheets are in the higher value added thin gauge segment.

3.2.7 Structure of steel industry in India

3.2.7.1 Types of Steel

Usually Steel is a mixture of iron and carbon but it may also contain some other metallic or non-metallic elements such as manganese, silicon, nickel, lead, copper, chromium, etc.

On the basis of its composition, steel is divided into alloy steel and non-alloy steel. The steel which is produced using elements like manganese, silicon, nickel, chromium, etc., is called alloy steel while the steel without any alloying elements except carbon, which is normally present in it, is called non-alloy steel. Non- alloy steel can be mild steel which have up to 0.3 % of carbon content, medium steel with 0.3 % to 0.6 % of carbon content or high steel with more than 0.6 % of carbon content. All types of steel other than mild steel are called special steel. Steel with different composition has different properties In India, non-alloying steel constitutes about 95 percent of total finished steel production, and mild steel has large share in it.

On the basis of end use, steel is divided into structural steels, construction steel, deep drawing steel, forging quality, rail steel, etc.

On the basis of shape, size and form, steel is divided into different types such as liquid steel, ingots, semi-finished steel and finished steel. Liquid steel is the first product that comes out from furnace and then it is converted into ingots, and then ingots are converted to semis or semi-finished steel products, Crude steel generally include ingots and semis. Semis are further subject to forging and rolling for producing finish steel products such as flat steel products and long steel products.

a. Flat Steel

Flat steel are steel products in flat, plate, sheet or strip shapes. Flat Steel is mostly used in construction, shipbuilding, pipes and boiler applications.

- Cold Rolled Steel
- Galvanized Steel or GP/GC Sheets
- HR Coils

b. Long Steel

Long Steel are steel products in long, bar or rod shape like reinforced rods made of sponge iron. The steel long products are used in producing concrete, blocks, bars, tools, gears and engineering products.

3.2.7.2 Manufacturing process of steel

Following are the manufacturing process used in the production of steel (Indicus Analytics, 2009).

1. Blast furnace/basic oxygen furnace (BF/BOF)

Iron ore is converted into liquid form of Iron by BF but Iron produced by BF has high carbon content and other impurities, this iron is called pig iron. Because of its high carbon content, Pig iron has limited end user applications. To make steel products out of pig iron The Basic oxygen furnace is used for producing steel from the refined iron. Where its carbon content and other impurities are burnt or removed through slag separation. At present around 67% of the world steel is produced through BF/BOF route. This route is very good for volume production. Iron ore and coal/coke are used in BF as main inputs. BOF is also called oxygen furnace because oxygen is the only fuel used in the process. But the process requires high capital cost and substantial investments on infrastructure. Producers that use this technology include SAIL, RINL, TSL and JSWL.

2. Electric Arc Furnace (EAF)

Steel scrap or Pig iron or Sponge iron is used as the raw material in this process. Basic purpose of the EAF is re-melting sponge iron, steel scrap, and pig iron. At present around 31% of world steel is produced by this process. It uses electricity as much as 400-500 kWh/ton. EAF is an environment friendly process and has flexibility to produce variety of value added grades of steel. ISPAT, ESSAR, and the Jindal group are examples of producers, who use this technology.

3. COREX or Cipcor Process

COREX is an advance process of producing steel. The process is used by a few only. Non-coking coal can directly be used in smelting work and lump ore and pellets are used as inputs in this process. With These two advantages steel producers can eliminated coking plants and sinter plants. Coking plant converts non-coking coal into more efficient fuel and sinter plant purify lump ore or pellets for further processing. Basic inputs to COREX are iron-ore and coal. Jindal Iron & Steel Company (JISCO) uses COREX technology to produce finished steel.

4. Induction Arc Furnace (IAF)

IAF is one of the most advance processes of steel making. IAF uses electricity as its main fuel. IAF is the most environment friendly steel making process and one of the most efficient ways of producing steel. But IAF requires clean products as its inputs as it lacks refining capacity. Large numbers of small steel companies use this technology. The high weight of the product significantly pushes up transport and movement costs. Therefore large integrated plants are the norm for cost efficient production. For specialized steel and alloys efficient production by smaller plants is possible.

3.2.7.3 Types of Steel Producers in India

There are mainly two types of steel producers in India (Corporate catalyst, 2015) as follows,

- Integrated producers, and
- Secondary producers

1. Integrated steel producers

Integrated steel producers have traditionally integrated steel units for which iron ore and coke are the main inputs. At present there are three main integrated producers of steel in India namely,

- Steel Authority of India Limited (SAIL),

- Tata Iron and Steel Co Ltd (TISCO) and
- Rashtriya Ispat Nigam Ltd (RINL).

SAIL dominates among the three integrated steel plants and this is because of its large steel production capacity plant size.

2. Secondary producers

Secondary producers use steel scrap or sponge iron or hot briquetted iron (HBI) as their inputs. Secondary producers mainly use Electric Arc Furnace (EAF) and Induction Furnace (IF) units. The followings are among the Secondary producers in India,

- Essar Steel Ltd.,
- Ispat Industries Ltd., and
- JSW Steel Ltd.

The integrated producers constitute most of the mild steel production in India. Their main products include flat steel products such as Hot Rolled, Cold Rolled and Galvanized steel. They also produce long and special steel in small quantities. On the other, secondary producers largely produce long steel products.

3.3 CHAPTER SUMMARY

The present chapter gives an overview of Indian Steel Industry. It also gives a brief history of steel and a brief overview of world steel industry. The chapter discusses how Indian steel industry has evolved with the passage of time and where it stands now in world steel industry. Furthermore, the chapter discusses about Crude steel production and consumption, import and export of Steel, demand and supply of steel, production process of steel, major players of steel in Indian steel Industry etc.

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Chapter - 4

Profile of Steel Authority of India Limited

Chapter - 4

Profile of Steel Authority of India Limited

4.0 INTRODUCTION

Steel Authority of India Limited (SAIL) is a leading steel-making company in India and one of the seven *Maharatnas* Central Public Sector Enterprises. It has fully integrated iron and steel plants and produces basic and special steel products. It caters the need of construction, engineering, power, railway, automotive and defence industries in India (SAIL, n.d.) and also exports it to overseas markets. SAIL produces a broad range of steel products, like hot &cold rolled sheets and coils, galvanized sheets, electrical sheets, structurals, railway products, plates, bars, rods, stainless steel and other alloy steels (SAIL, 2014).

SAIL has five integrated plants i.e. Bhilai Steel Plant, Durgapur Steel Plant, Rourkela Steel Plant, Bokaro Steel Plant and IISCO Steel Plant and three special steel plants i.e. Alloy Steel Plant, Salem Steel Plant and Visvesvaraya Iron and Steel Plant. All these plants are located in the eastern and central regions of India. These plants are situated close to domestic sources of raw materials. SAIL also has Company’s iron ore, limestone and dolomite mines near its plants. SAIL is the India’s second largest producer of iron ore and has the country’s second largest mines network. Therefore, SAIL is competitive in terms of availability of iron ore, limestone, and dolomite, the inputs for steel making.

SAIL has a Central Marketing Organization (CMO) which has a network of 37 Branch Sales Offices spread across the country, 25 Departmental Warehouses, 42 Consignment Agents and 27 Customer Contact Offices. CMO has the responsibility to carried out the marketing of wide range of long and flat steel products which are much in demand in India as well as in the overseas markets. The demands of customers in the remote areas of the country is meet by an ever increasing network of rural dealers, these dealer supplemented marketing efforts of CMO in domestic market. At present there are more than 2000 rural dealers in the country. SAIL's wide spread marketing ensures availability of quality steel in all the districts of the country.

Exports of Mild Steel products and Pig Iron from SAIL's five integrated steel plants are undertaken by International Trade Division (ITD). ITD is an ISO 9001:2000 accredited unit of CMO, located at New Delhi.

SAIL's Consultancy Division (SAILCON) located at New Delhi, with four decades of technical and managerial expertise and know-how in steel making, offers services and consultancy to clients all over the world.

SAIL has a well-equipped Research and Development Centre for Iron and Steel (RDCIS) at Ranchi which helps to produce quality steel and develop new technologies for the steel industry. SAIL also has its own in-house Centre for Engineering and Technology (CET), Management Training Institute (MTI) and Safety Organization at Ranchi. Captive mines of SAIL are under the control of the Raw Materials Division in Kolkata. The Environment Management Division and Growth Division of SAIL operate from their headquarters in Kolkata (SAIL, n.d,).

4.1 BRIEF HISTORY OF STEEL AUTHORITY OF INDIA LIMITED (SAIL)

After the independence of India, a need was felt to develop the infrastructure for rapid industrialization of the country. The steel sector was crucial to propel the economic growth of the country. Therefore, Hindustan Steel Private Limited (HSL) was set up on January 19, 1954. Initially, HSL was designed to manage only one plant that is Rourkela steel plant. The preliminary work was done by the Iron and Steel Ministry for Bhilai and Durgapur Steel Plants. But the supervision and control of Bhilai and Durgapur steel plants were also transferred to Hindustan Steel from April 1957. The registered office of HSC was originally in New Delhi but later, it was moved to Calcutta in July 1956 and ultimately to Ranchi in December 1959 (SAIL, n.d)

Bhilai and Rourkela Steel Plants completed their 1 Million tonne stage by the end of December 1961. One Million tonne phase of Durgapur Steel Plant was completed in January 1962, after commissioning of the Wheel and Axle plant. The crude steel production of HSL increased from .158 Million Tonne in 1959-60 to 1.6 Million Tonne. Bokaro Steel Limited was established in January 1964 to construct and operate the steel plant at Bokaro. Bhilai Steel Plant completed its second phase in September 1967, after commissioning of the Wire Rod Mill. Tandem Mill, the last unit of 1.8 Million Tonne phase of Rourkela was commissioned in February 1968 and the 1.6 MT stage of Durgapur Steel Plant was completed in August 1969, after commissioning of the Furnace in SMS. With the completion of the 2.5 MT stage at Bhilai, 1.8 MT at Rourkela and 1.6 MT at Durgapur, the total crude steel production capacity of HSL increased to 3.7 MT in the year 1968-69 and to 4.0 MT in the year 1972-73 (SAIL, n.d).

The Ministry of Steel and Mines presented a newly drafted policy statement to the Parliament on December 2, 1972 to evolve a new model for managing the steel industry by creating a holding company to manage inputs and outputs under one umbrella. Based on this, Steel Authority of India Ltd was incorporated on January 24, 1973, with an authorized capital of Rs. 2000 crores. SAIL was made responsible for managing five integrated steel plants at Bhilai, Bokaro, Durgapur, Rourkela and Burnpur, the Alloy Steel Plant and the Salem Steel Plant. Later, SAIL was restructured as an operating company in the year 1978.

SAIL is playing a crucial role in developing a sound infrastructure for the industrial development of the country since its inspection. It has greatly contributed to the development of technical and managerial expertise. It has triggered the secondary and tertiary waves of economic growth by continuously providing the inputs for the consuming industry (Prathuru, 2012).

4.2 OWNERSHIP AND MANAGEMENT

The Government of India owns about 75% of SAIL's equity and retains voting control of the Company. However, by virtue of its '*Maharatna*' status, SAIL enjoys significant operational and financial autonomy (SAIL, n.d.).

4.3 VISION

To be a respected world Class Corporation and the leader in Indian steel business in quality, productivity, profitability and customer satisfaction. (SAIL, n.d).

4.4 BOARD OF DIRECTORS

Table 4.1 shows the present composition of board of directors of Steel Authority of India Limited.

Table 4.1: Board of Directors of SAIL

No.	Designation	Name
1.	Chairman	Shri P K Singh
2.	Addl. Secretary & Financial Adviser to the Government of India	Smt. Bharathi Sivaswami Sihag
3.	Director – Finance	Shri Anil Kumar Chaudhary
4.	Director – Technical	Shri SSMohanty
5.	Director – Personnel	Dr. N Mohapatra
6.	Director – Projects & Business Planning	Shri G. Vishwakarma
7.	Director – Raw Material & Logistics	Shri KalyanMaity
8.	Independent Director	Dr. Atmanand
9.	Independent Director	Shri J.M. Mauskar
10.	Independent Director	Shri P K Dash
11.	Independent Director	Prof. Ashok Gupta
12.	Independent Director	Shri Pramod Bindal
13.	Independent Director	Smt. Anshu Vaish
14.	Director – Commercial	Shri Binod Kumar
15.	Joint Secretary to the Government of India	Shri Sunil Barthwal

Source: *SAIL*

4.5 PLANTS AND PRODUCTS OF SAIL

SAIL produces and provide vital as well as basic infrastructure facilities across the length and breadth of India. SAIL is continuously meeting the growing demand for steel from different sectors contributing in the growth of Indian economy like infrastructure, railways, power, transportation, defence, oil & gas, heavy industries, construction, white goods, automobiles, etc. With an unmatched range of mild steel, both in long and flat categories, as well as a wide variety of special and stainless steels. Different products of SAIL are as follows:

Table 4.2: Plants and products of SAIL

Plants	State	Products
Bhilai Steel Plant (BSP)	Chhattisgarh	Rails (13/26m), Long Rails, (65-260m), Blooms, Billets, Slabs, Channels, Joists, Angles, TMT Rebars, Wire Rods, Crane Rails, Plates, Pig iron & Coal Chemicals
Durgapur Steel Plant (DSP)	West Bengal	Blooms, Billets, Joists, Narrow Slabs, Channels, Angles, TMT Rebars, Wheels & Axles, Pig iron & Coal Chemicals
Rourkela Steel Plant (RSP)	Orissa	Plate Mill Plates, HR Plates, HR Coils, Slabs, CR Sheet/ Coil, Galvanized Sheets (plain & Corrugated), ERW Pipes, Spiral Weld pipes, CRNO, Pig iron & Coal Chemicals
Bokaro steel Plant	Jharkand	Hr Coils, Slabs, HR Sheets. Plates, CR Coils. Sheets, GP Sheets. coils, GC Sheets, Galvanized Steel, HRPO, Pig iron & Coal Chemicals
IISCO Steel Plant (ISP)	West Bengal	Wire rods, Bars & Rebars, Joists, Channels, Angles, Blooms, Billets, Universal & Special section (Z-bar, MS Arch), Pig iron & Coal Chemicals
Alloy Steels Plants (ASP)	West Bengal	Alloy Steel Squares & Rounds, Wear Resistant Plates, Forgings, Carne Wheels, Forged Rolls/ Plates, Special Quality Slabs & Stainless Steel Slabs (low Ni, 300 & 400 series)
Salem Steel Plant (SSP)	Tamil Nadu	Cold Rolled Stainless Steel, Hot Rolled Carbon & Stainless Steel Products, Micro-Alloyed Carbon Steel
Visvesvaraya Iron and Steel Plant (VISL)	Karnataka	High Quality Rolled & Forged Alloy & Special Steel Products
Chandrapur Ferro Alloy Plant	Maharashtra	High/ Medium/ Low carbon Ferro-Manganese, Silico-Manganese

Source: *SAIL*

4.5.1 Integrated Plants

1. Bhilai steel Plant (BSP)

Bhilai Steel Plant (BSP) is India's only manufacturer of rails and heavy steel plates and a major producer of structural. It was set up with the help of the USSR in 1955. The plant also specializes in other products such as wire rods and merchant products. BSP has an annual production capacity of 3.153 Million Tonnes of saleable steel. It is certified with ISO 9001:2000 Quality Management System Standard, SA: 8000 certification for social accountability, the OHSAS-18001 certification for Occupational health & safety and IS0:14001 for Environment Management System. It has bagged the CII-ITC Sustainability award for three consecutive years among the long list of national awards it has won (SAIL, n.d).

2. *Durgapur Steel Plant (DSP)*

Established in the 1955, DSP started with an initial capacity of one million tonnes of crude steel per year which later expanded to 1.6 million tonnes in 70's. Further, with a massive modernization programme in early 90's, the capacity of the plant increased to 2.088 million tonnes of hot metal, 1.8 million tonnes crude steel and 1.586 million tonnes saleable steel. The plant is accredited with ISO 9001: 2000 quality management system, accredited with ISO: 9002 quality assurance certification (SAIL, n.d).

3. *Rourkela Steel Plant (RSP)*

The plant was set up with German collaboration in 1955 with an installed capacity of 1 million tonnes which later enhanced to 1.9 million tonnes. The plant has undergone modernization in the mid-1990s. RSP was the first plant in India to incorporate LD technology of steel making and the first steel plant in SAIL and the only where 100% of slabs are produced through the cost-effective and quality-centric continuous casting route. The present capacity of plant is to produce 2 million tonnes of hot metal, 1.9 million tonnes of crude steel and 1.67 million tonnes of saleable steel. It is SAIL’s only plant that produces silicon steels for the power sector, high quality pipes for the oil & gas sector and tin plates for the packaging industry. Expansion project in the plant has been implemented with capital investment of around of Rs 12,000 crores for the massive modernization (SAIL, n.d.).

4. ***Bokaro Steel Plant (BSL)***

Incorporated originally as a limited company on 29th January 1964, BSL later merged with SAIL. The Plant is the country's first *Swadeshi* steel plant. It was built with local equipment, material and know-how. The modernization of 90s' has further upgraded the capacity to 4.5 MT of liquid steel. Many other new features have been added by modernization of plant. Bokaro is producing top quality hot rolled products that are well accepted in the international market. Bokaro also implements various programme under its corporate social responsibility (SAIL, n.d).

5. ***IISCO Steel Plant (ISP)***

Established in 1918 with the name Indian Iron & Steel Company (IISCO), ISP amalgamated with SAIL on 16th February 2006 and renamed as IISCO Steel Plant (ISP). With time, the plant was upgraded to produce 4.26 lakh tonnes of saleable steel and 2.54 lakh tonnes of pig iron per annum. ISP produces a wide range of products that have been acknowledged for their finest quality and enjoys exclusive market dominance for some products. Currently, ISP is raising its saleable steel capacity to 2.5 million tonnes per annum with the help of Rs.16480 crore modernization-cum-expansion programme. ISP is the owner of India's oldest unit that produces pig iron by modern methods at Kulti. This unit at Kulti was set up in the year 1870 by Bengal and iron works Co. (BIW). BIW was absorbed by IISCO in 1936 and steel making started as a regular measure in 1939. Another company named Steel Corporation of Bengal (SCOB), established in 1937, was also amalgamated with IISCO in 1952 (SAIL, n.d).

4.5.2 Special Steel Plants

1. ***Alloy Steels Plants (ASP) in West Bengal***

It was set up in January 1965 to make India self-reliant in alloy & special steels production. ASP is located at Durgapur in Burdwan district of West Bengal. It is spread over an area of around 4.67 Sq. KM (467.22 Hectare). M/s MN Dastur & Co.

was the Consultant for ASP and the Technology knowhow was provided from M/s Atlas Steels, Canada. A Japanese Consortium, named JASCON, was the Major equipment supplier, while the Reheating Furnaces were supplied by Amco, Canada and Heat Treatment Furnaces supplied by Wellman Incandescent. ASP has been selected as the site where the world's 2nd largest commercial iron nugget making plant of 0.5 Million Tonnes capacity based on ITmk3 technology will be set up by SAIL-Kobe Iron India Pvt. Ltd. (SKIIPL) which is a Joint Venture Company formed by SAIL with M/s Kobe Steel, Japan (SAIL, n.d).

2. *Salem Steel Plant (SSP) in Tamil Nadu*

SSP is the supplier of wider width stainless steel sheets/coils in India. It has an installed capacity of 70,000 tonnes per year in Cold Rolling Mill and 1, 86,000 tonnes per year in Hot Rolling Mill. In addition, the plant has country's first top-of-the-line stainless steel blanking facility with a capacity of 3,600 tonnes per year of coin blanks and utility blanks/circles. Salem Steel Plant is presently going through Expansion and modernization (SAIL, n.d).

3. *Visvesvaraya Iron and Steel Plant (VISL) in Karnataka*

Visvesvaraya Iron and Steel Plant (VISL) was set up as the *Mysore Iron Works* on January 18, 1923 by Sir M Visvesvaraya. It is a pioneer in production of high quality alloy and special steels and pig iron. VISL has an installed capacity of 77,000 tonnes of alloy and special steels and 205,000 tonnes of hot metal. VISL has accredited with the ISO / TS 16949: 2009 certificate for steel production through rolled and forged routes and pig iron production (SAIL, n.d).

4.5.3 Ferro Alloy Plant

1. *Chandrapur Ferro Alloy Plant*

Chandrapur Ferro Alloy Plant is the only Public Sector Unit engaged in production of Manganese based Ferro Alloys in India. It became a Unit of SAIL on 12th July 2011.The plant is situated at Chandrapur in Maharashtra. It is located 166 km away from Nagpur on Delhi-Chennai rail route and is well connected by rail & road to the major cities of India. CFP has an installed capacity of 1, 00,000 Tonnes per Year

Ferro Manganese. CFP has been certified with Quality Assurance Certificate ISO 9001:2008. The latest technological development in the plant is state of the art Layer Casting Technology for casting molten Ferro Alloys and Ferro Alloy Processing Unit which is first of its kind in India (SAIL, n.d).

4.5.4 Subsidiary

1. *SAIL Refractory Company Limited*

The Government of India took over Burn Standard Company Limited which underwent a modernization & expansion programme in order to meet the growing demand of high quality basic refractories in the modern steel plants of SAIL and other private sector companies. The Salem Refractory Unit of Burn Standard Company Limited (BSCL) became a wholly-owned subsidiary of SAIL on December 16, 2011. The unit has now been renamed as SAIL Refractory Company Limited (SRCL). SRCL is located in Salem in the state of Tamil Nadu. It has an installed capacity of 1500 Million Tonnes per month for manufacturing calcined magnesite, 1200 Million Tonnes for basic bricks, 500 Million Tonnes for mag-carb bricks, 3000 Million Tonnes for bulk & monolithic and 2000 Million Tonnes for dunite. SRCL has 1718.3 acres of leasehold mining land spread over three locations. The company has an estimated quantum of magnesite reserves of about 10 Million Tonnes and about 9 Million Tonnes reserve of dunite (SAIL, n.d).

4.5.5 Other units

- SAIL Consultancy Division (SAILCON)
- R&D Centre for Iron and Steel
- Management Training Institute
- SAIL Safety Organization
- Environment Management Division
- Raw Materials Division
- Growth division
- Central Power Training Institute
- Central Marketing Organization
- Central Coal Supply Organization

- SAIL Refractory Unit (SRU)

4.6 JOINT VENTURES OF SAIL

Table 4.3 shows joint ventures of Steel Authority of India Limited with various organizations.

Table 4.3: Joint Ventures of SAIL

S. No.	Joint Venture	Description
1.	NTPC SAIL Power Company Pvt. Limited (NSPCL)	A 50:50 basis joint venture to manage SAIL's captive power plants at Rourkela, Durgapur and Bhilai with a combined capacity of 814 megawatts (MW).
2.	Bokaro Power Supply Company Pvt. Limited (BPSCL):	A 50:50 basis joint venture with Damodar Valley Corporation (DVC) is managing the 302-MW power generating station and 660 tonnes per hour steam generation facilities at Bokaro Steel Plant.
3.	Mjunction Services Limited	A 50:50 joint venture with Tata steel to promotes e-commerce activities in steel and related areas including e-assets sales, events & conferences, coal sales & logistics, publications, etc.
4.	SAIL-Bansal Service Centre Limited	A joint venture with BMW Industries Ltd. on 40:60 bases for a service centre at Bokaro with the objective of adding value to steel.
5.	Bhilai JP Cement Limited	A 26:74 joint venture company with Jai Prakash Associates Ltd to set up a 2.2 million tonne (MT) slag-based cement plant at Bhilai.
6.	Bokaro JP Cement Limited	Another 26:74 joint venture company with Jai Prakash Associates Ltd to set up a 2.1 MT slag-based cement plant at Bokaro.
7.	SAIL & MOIL Ferro Alloys (Pvt.) Limited	A joint venture company between SAIL and Manganese Ore (India) Ltd on 50:50 basis to produce ferro-manganese and silico-manganese

		required in production of steel.
8.	S & T Mining Company Pvt. Limited	**A** joint venture company with Tata Steel on 50:50 bases for joint acquisition & development of mineral deposits to carry mining of minerals including exploration, development, mining and beneficiation of identified coking coal blocks.
9.	International Coal Ventures Private Limited	A joint venture company/SPV promoted by five central PSUs, viz. SAIL, CIL, RINL, NMDC and NTPC with 28.7%, 28.7%, 14.3%, 14.3% and 14.3% shareholding, respectively to acquire stake in coal mines/blocks/companies overseas for securing coking and thermal coal supplies.
10.	SAIL SCI Shipping Pvt. Limited	A 50:50 joint venture with Shipping Corporation of India to provide various shipping and related services to SAIL for importing of coking coal and other bulk materials and other shipping-related business
11.	SAIL RITES Bengal Wagon Industry Pvt. Limited**:**	A 50:50 joint venture with RITES to manufacture, sell, market, distribute and export railway wagons including high-end specialized wagons, wagon prototypes, fabricated components/parts of railway vehicles, rehabilitation of industrial locomotives, etc., for the domestic market
12.	SAIL SCL Limited	A 50:50 Joint Venture with Government of Kerala where SAIL has management control to revive the existing facilities at Steel Complex Ltd, Calicut and also to set up, develop and manage a TMT rolling mill of 65,000 MT capacity along with balancing facilities and auxiliaries.

Source: *SAIL*

4.7 MEMORANDUM OF UNDERSTANDING (MOU)

To pursue its strategic interests, SAIL has signed Memorandum of Understandings with several Indian and foreign companies:

Table 4.4: Memorandum of Understanding (MOU) of SAIL

1.	POSCO, Korea	Strategic alliance for cooperation in a wide range of business & commercial interest areas
2.	Kobe Steel Limited (KSL), Japan	The technical & economic feasibility of ITmk3 technology for producing premium grade iron nuggets using iron ore fines and non-coking coal
3.	RashtriyaIspat Nigam Ltd. (RINL):	For jointly exploring and developing high grade low silica limestone deposits of Qalhat in the sultanate of Oman for supply to steel plants of SAIL & RINL on a long term basis
4.	Larsen & Toubro Ltd (L&T):	To jointly set up, develop, manage and own captive/independent power plant(s) at suitable location/s to meet future power requirements of SAIL
5.	National Mineral Development Corporation (NMDC):	For jointly developing limestone mine at Arki in Solan district of Himachal Pradesh in 50:50 Joint Venture which will supply high grade low silica Limestone primarily to the steel plants of SAIL & NMDC
6.	Hindustan Prefab Ltd (HPL):	For jointly exploring the techno-economic viability of carrying out the business of prefabricated structures in steel and cement.
7.	IRCON	For jointly working on infrastructure projects having transportation by rail/road as a component both in India and abroad.

Source: *SAIL*

4.8 MODERNIZATION AND EXPANSION

During 2014, SAIL took a major step forward on the modernization & expansion front, with the new 4060 m Blast Furnace (largest in the country) at Rourkela Steel Plant, operational since August, 2013. It marked a new chapter in the modernization and expansion of the company. Thereafter, other upcoming facilities at RSP have also been operationalized. From June 2014, the entire integrated process route comprising the new Ore Bedding & Blending Plant, 360 sq.m. Sinter Plant, the 7 m tall,3rd Coke Oven Battery No.6, the 4060 m Blast Furnace No.7, the 3 BOF, 2500 mm Slab Caster and the Plate Rolling facility in the New 1.0 Million tonne per annum Plate Mill are operational at RSP. Work in the finishing mill of the Plate Mill will be completed shortly. The production from these facilities is being ramped up.

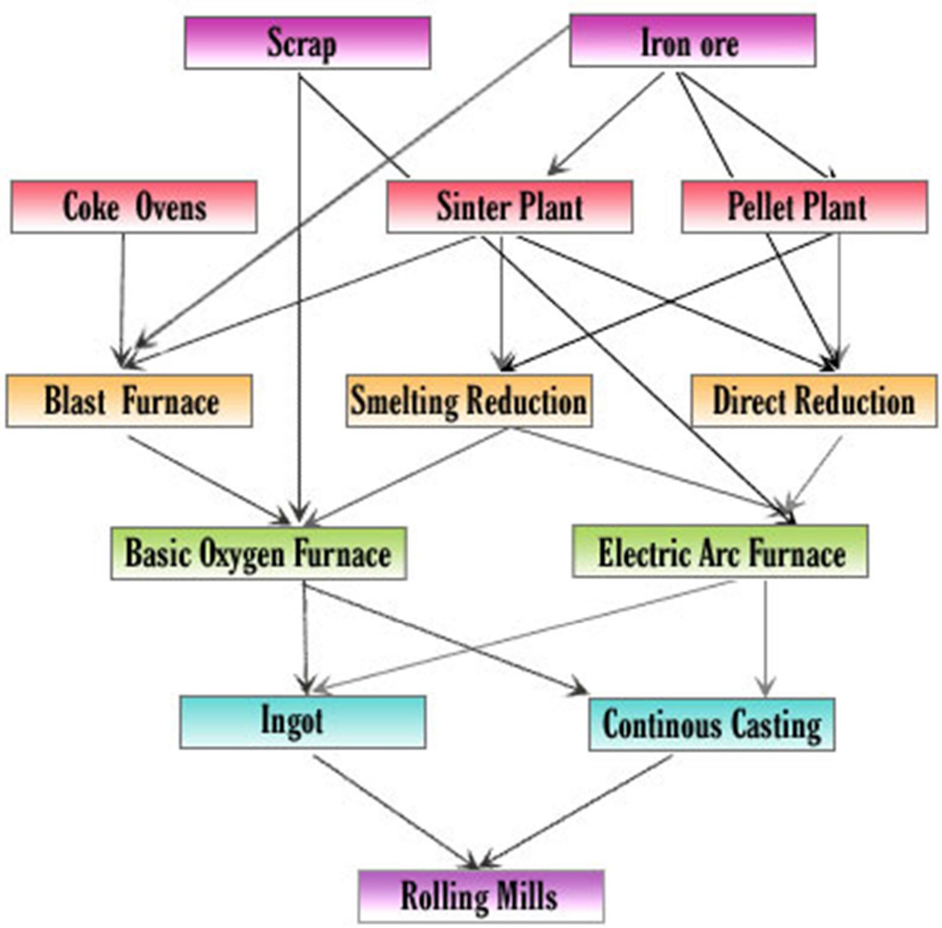
4.9 PRODUCTION AND CAPACITY

SAIL produced 12.9 million tonnes (MT) of saleable steel in 2014, an improvement of 4% over 2013. Production of 14.5 MT of hot metal and 13.6 MT of crude steel was also 1% higher each than corresponding period of last year, respectively. All-time best production of special quality & value added products of 5.42 MT was achieved, which was 6% higher than FY'13. Power Plants maintained the best ever power generation of 699 MW during 2013-14, with a growth of 1% over last year. During the year SAIL took a major step forward on the 3 modernizations& expansion front, with the new 4060 m Blast furnace.

4.10 MANUFACTURING PROCESS

Some of the technological options for converting iron ore to steel products are given in figure 4.1. Hot metal and crude steel process are also interlinked among themselves as represented by arrows.

Figure 4.1: Manufacturing Process of Steel



Source: *SAIL*

4.11 MAJOR ACHIEVEMENTS

Steel Authority of India Limited has won several awards and accolades for its excellent performance in various fields. Some of the major achievements are given in the table 4.5.

Table 4.5: Awards and Accolades of SAIL

YEAR	AWARDS AUTHORITY	AWARDS DETAIL
2013-14	Hon’ble Prime Minister	The Prime Minister’s Trophy for the Best Performing Integrated Steel Plant (ISP) in the Country
2012-13	The Hon'ble President of India on Public Sector Day function	SCOPE Award for Best Practices in Human Resource Management for the year 2011-12
2012-13	Hon'ble President of India	Rashtriya Khel Protsahan Puraskar - 2012
2011-12	Hon’ble Prime Minister	MoU Excellence Award‘ for the year 2010-11
2011-12	Indian Institution of Industrial Engineering	Performance Excellence Awards - 2010‘
2010-11	Union Minister for Home Affairs Shri P. Chidambaram	Golden Peacock Environment Management Award for the year 2011
2009-10	International quality circle meet, Phillipines, 2009	Eight gold, one silver, six bronze won by SAIL employees
2008-09	National Institute of Personnel Management	the National Award on SAIL for Best HR Practices 2008.
2007-08	Ministry of Rural Development, Govt. of India during the National Conference of Youth Hostels Association (YHAI).	Corporate Social Responsibility Award
2006-07	Indian Institute of Metals	National Sustainability Award for 2006

Source: *SAIL*

4.12 ENVIRONMENT POLICY

SAIL reaffirms its commitment to contributing towards a clean and sustainable environment and continually enhancing its environmental performance as an integral part of its business philosophy and value. Towards this commitment, SAIL shall:

- Integrate sound environmental management practices in all the activities.
- Conduct the operation in an environmentally responsible manner to comply with applicable legal and other requirement related to its environmental aspect and strives to be beyond.
- Progressively adopting cleaner and energy efficient technologies.
- Minimize waste generation and promote recovery, recycle and reuse.
- Increase greenery in and around the plants and mines.
- Strive for continual improvement in environmental performance by setting challenging targets, measuring progress, taking corrective action and communicating environmental information to all concerned.
- Enhance environmental awareness amongst all employees working for and on behalf of SAIL and the general population living around plants and mines.
- Encourage the business associates to adopt similar approach for environmental protection.

In order to attain the compliance with environmental laws, SAIL has established separate department on environment at all the Plant/Units. It has an Environment Management Division at the corporate level. The Company is also complying with all the forestry laws as per the laid down conditions. In addition to this, conditions imposed by the State Government(s) are also complied with. The ongoing Modernization and Expansion programme of the Company, apart from increasing the production capacity, also envisages installation of more efficient & environment friendly technologies and incorporation of latest pollution control technologies and equipment. The Company is spending about Rs. 5000 crores on pollution control scheme out of the total outlay of about Rs. 72000 crores for the on-going Modernization and Expansion programme. Various environmental protection and conservation measures being undertaken by the Company are mentioned in MD&A Report.

4.13 HUMAN RESOURCE POLICY

SAIL has achieved its present level of excellence through investing in its human resource, whose skill and knowledge constitute the basis of every initiative, be it technology or innovation. Developing skills and capabilities of employees to improve manpower utilization and labour productivity is the key thrust area of Human Resource Management (HRM) in SAIL. SAIL achieved the highest ever Labour Productivity (LP) of 278 tonnes of crude steel in 2013-14. The manpower strength of SAIL was 97897 (as on 31.03.2014) with manpower rationalization of 3981 achieved during the year. Developing Employee Capabilities & Competencies in order to develop its human resources for harnessing their potential, SAIL has been making sustained efforts through various training and development activities with focus on preservation of skills, transfer of skills and knowledge, training in specialized/advanced skills and technology in collaboration with reputed organizations and development of effective managerial competencies through association with premier institutes.

4.13.1 Harmonious Employee Relations

SAIL has a tradition of conducive and fulfilling employee relations environment. The healthy practice of settling the issues through discussions with trade unions or workers' representatives enabled workers' participation at different levels and facilitated in establishing a peaceful IR climate. Some of these forums are functioning since early seventies and are sufficiently empowered to address different issues related to wage, safety, and welfare of workers.

4.13.2 Grievance Redressal Mechanism

Internal grievances redressal machinery exists in SAIL Plants and Units, separately for executives and non-executives. The grievance procedure in SAIL has been evolved after sustained deliberations and involvement of employees, trade unions and associations. Joint grievance committees have been set up at Plant/Unit level for effective redressal of grievances. The grievances are dealt through a 3 stage grievance handling system and employees are given an opportunity at every stage to raise grievances relating to wage irregularities, working conditions, transfers, leave, work assignments and welfare amenities etc.

4.14 SWOT ANALYSIS

4.14.1 Opportunities & Threats for SAIL

a. Opportunities:

- The Indian steel industry is poised for a robust growth over the medium term. There would be opportunities provided by a rapidly expanding domestic market.
- Focus on infrastructure projects viz. industrial freight corridors, new ports and new cities planned along the freight corridors provide opportunities for enhanced steel consumption.

b. Threats:

- Intensification of competition from domestic as well as foreign steel producers.
- Fall in international steel prices due to decline in raw material prices both for iron ore & coking coal.
- Excess steel capacity in the country could lead to a margin squeeze.
- Slowing growth in China could potentially increase competition from cheap imports.

4.14.2 Strengths & Weaknesses

a. Strengths

Strengths of SAIL include diversified product mix, well established nationwide marketing network, captive iron ore resources, skilled manpower, captive power plants, land bank for future expansion, dedicated R&D wing and strong balance sheet. Further, the on-going modernization is going to take SAIL ahead in terms of modern technology adoption, automation, product quality, bigger product basket, process efficiency & diversification opportunities. The diversified product mix and multilocation production units are an area of strength for the Company. Also, it has a nationwide distribution network, with presence in every district in India. SAIL has the largest captive iron ore operations in India, which takes care of its entire requirement. With plans in place to expand the mining operations, the Company will continue to be self-sufficient in iron ore after completion of the on-going phase of expansion. SAIL's large skilled manpower base is a source of strength. With emphasis on selective skilled recruitment for manning of upcoming facilities and recoupment against superannuating manpower, the manpower profile as well as the labour productivity will improve gradually over the years. SAIL's captive Power Plants take care of about 70% of its total power need. With augmentation of capacities of Power Plants operated under Joint Venture, the Company will continue to have security in this key input in future as well. The Company has one of the biggest in-house research and development centres in Asia. SAIL's RDCIS (Research & Development Centre for Iron & Steel) is a source of regular product and process innovation. Low overall borrowings lend strength to the Company's Balance Sheet as it can mobilize resources while keeping the leveraging at manageable levels.

b. Weaknesses

Dependence on external sources for key input like coking coal leads to exposure of the Company to the market risk. Regular superannuation in large numbers, over the years, has resulted in skill depletion largely in the technical areas. Transfer of skill and knowledge has to be given thrust. Besides, technological up-gradations and modernization also call for consistent efforts towards competency development of employees. Adverse employee age mix, with the average age of 47 years is a serious concern. Skilled and competent manpower is required to move to a more favourable manpower age profile. A part of the operations in the Company continues to be from energy inefficient processes viz. open hearth and ingot route of production, which will be eliminated only after the completion of the current expansion program. At present around 20% of the products are in the form of semi-Finished Steel, resulting in lower value addition. This will continue till new rolling mills planned under current expansion programme contribute to value addition, as almost all semis will be converted to Finished Steel.

4.15 CORPORATE GOVERNANCE

The philosophy of the Company in relation to corporate governance is to ensure transparency, disclosures and reporting that conforms fully to laws, regulations and guidelines, and to promote ethical conduct throughout the Organization, with the primary objective of enhancing shareholders value, while being a responsible corporate citizen. The Company is committed to conforming to the highest standards of corporate governance in the Country. It recognizes that the Board is accountable to all shareholders and that each member of the Board owes his/her first duty for protecting and furthering the interest of the Company.

4.16 CORPORATE SOCIAL RESPONSIBILITY

From the establishment of SAIL in 1973, a system was put in place for socio-economic development of the neighbourhoods and communities operated by SAIL's plants and units to minimize inequalities among the people by providing them quality education, healthcare, infrastructure and employment avenues, while simultaneously promoting scientific temperament and modern technology. SAIL has taken effective measures in the field of environment conservation, health and medical care, education, women's upliftment, providing potable drinking water and ancillary development at each of its plants and units. By which, SAIL has contributed greatly in the economic development of these areas.

- **Peripheral Development**

Under Peripheral Development SAIL's plants and units undertake different activities around the plant and units up to a radius of 16 kms. Programmes are undertaken by each plant in the area of road connectivity, construction of bridges/culverts, access to improved water sources, etc, in close coordination with the State and District administrations as well as the local *Panchayats*, social organizations and people's representatives.

- **Medical and Health Care**

The company provides healthy living conditions for its employees as well as the people living in peripheral areas. SAIL has established 54 primary health centre, 12 reproductive & child health (RCH) centre, 17 hospitals and 7 super-speciality hospitals to provide modern health care to more than 30.60 million people. These centres celebrate occasions such as World Health Day, World Blood Donor Day, and Newborn Week etc., to enhance awareness and sensitize people on health-related issues. SAIL has been implementing an AIDS awareness & control programme in partnership with the National AIDS Control Organization (NACO), Ministry of Health & Family Welfare, since 1999-2000. SAIL is also participating in other national health programmes like TB control, anti-malaria, leprosy eradication etc.

The company also organizes a number of health camps at various villages for immunization, blood donation, etc and to bring about awareness on health-related issues by distributing water purification tablets, handbills and other means of audio-visual communication. In 2009-10, more than 3850 camps were organized where over 2.32 Lakh of people got benefitted.

- **Preservation of Art & Culture**

SAIL has been contributing to the preservation of traditional forms of Indian art and culture. Performers are regularly invited and felicitated by SAIL. SAIL also organizes live shows and concerts and encourages their reception and appreciation in the society. SAIL provides financial help to organizations like SPICMACAY to promote classical arts. SAIL is preserving the Lodhi Tomb complex in New Delhi, Along with Archaeological Survey of India. Developmental work has also been undertaken by SAIL plants at various archeological sites in India.

- **Environment**

SAIL carry plantation across all its plants and mines. SAIL restored 200 acres of degraded land through afforestation at Purnapani flux mines of SAIL in Orissa. Pisiculture has been done in the abandoned quarries at Purnapani and 300,000 fishlings have been released in the quarry waters. Plantation of 10,000 saplings in 10 acres of degraded land has been planned. Out of that, plantation of 4,000 saplings has been completed at Barsua Iron Ore Mines. Recently, Medicinal plantation of Amla was undertaken in Chhatisgarh region. SAIL has signed an agreement with

Department of Bio-technology, Government of India and Centre for Environment Management for Degraded Eco-system.

- **Roads**

SAIL has been actively involved in the construction and repair of roads, thereby providing connecting facilities to nearly 2 lakh people across 329 villages every year. SAIL constructed a road, connecting the Salem plant to National Highway 7 in Tamil Nadu. In the year 2009-10, 103.35 kms of road were constructed benefiting 17,24,114 people. Till March 2010, more than 73 lakh people, across 435 villages, reaped the advantage of the modern network of roads built by SAIL.

- **Creating Sustainable Incomes**

SAIL is constantly working to impart training and help to the communities to make them self-sustaining units that can generate incomes for themselves. People living in the peripheral area of SAIL's plants/ units are taught the skills that will help them to merit more than two square meals a day. During the last three years, SAIL has provided vocational training to around 44,000 people in and around SAIL Plants/units.

- **Ancillary Development**

Good suppliers are intangible assets to any organization. SAIL has been supporting ancillary industries by providing land, supply of potable water, infrastructure facilities, consultation for developing the industry, publication of printed matter to inform the entrepreneurs of SAIL's requirements, special exhibitions of parts and drawings to get the exact specifications and ideas, exemption from paying EMD, security deposit etc. SAIL also provides handling equipment to these industries on hire basis, testing facilities providing available raw materials for manufacture, etc. For ancillarisation and industries development in the Chattisgarh region, the Government of Madhya Pradesh had conferred the prestigious 'Sahayak Udyag Mitra' award on Bhilai Steel Plant in 1997.

- **Women Upliftment**

Since the inception of SAIL, *Mahila Samities* have been formed in all SAIL's plant. The *Samities* are comprises of spouses of the employees as its members. Spouses of MDs, EDs etc, are also a member of *Mahila Samitie*. The various activities being performed by the *Samities* includes:

- women empowerment and development
- community welfare activities
- assistance during natural calamities
- manufacturing products for general use in plants
- providing assistance to women belonging to economically weaker section etc
- providing vocational training to women
- facilitating access to education for needy girl children

- **Model Steel villages**

SAIL has adopted 79 villages across 8 states to develop them as Model Steel Villages (MSVs) in a phased manner. The developmental activities undertaken in these villages include medical & health services, education, roads & connectivity, sanitation, community centres, livelihood generation, sports facilities. By March 2012, the development of 71 MSVs has successfully been completed.

- **Family Welfare**

All SAIL hospitals have participated in the National Reproductive and Child Health programme (RCH). SAIL also participates in other National Health Programmes like National Tuberculosis Program, anti-Malaria, Anti Leprosy Program etc. There are 20 hospitals including 4 state-of-art hospitals situated throughout the country having a total strength of around 4000 beds for the benefit of employees, their dependents and the peripheral population. They are managed by trained medical staff of around 4000 people.

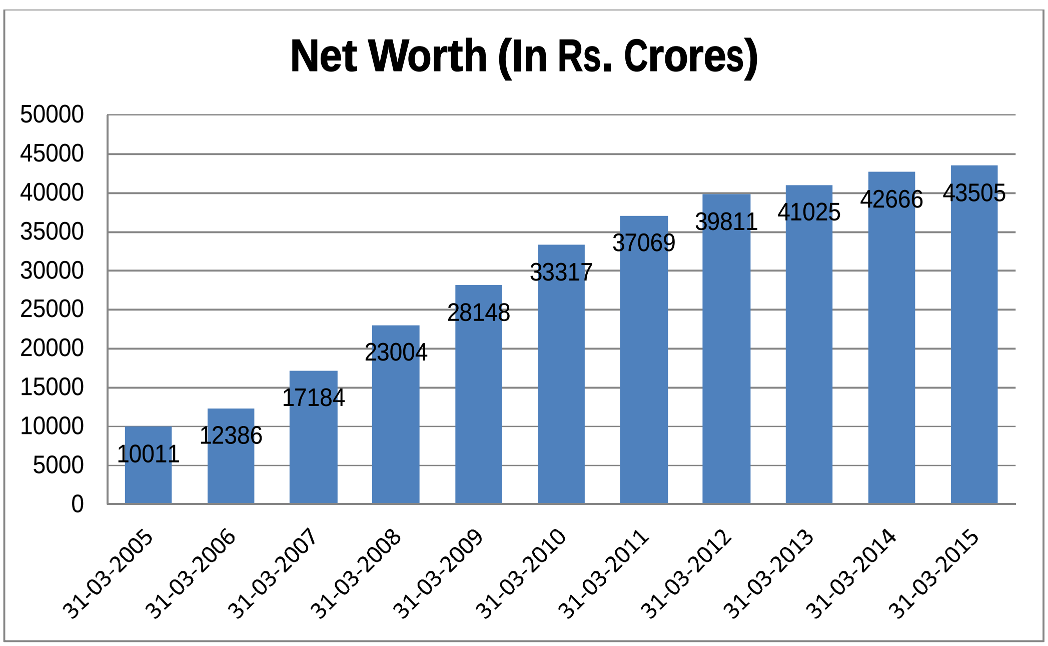
SAIL promotes the Government's Small Family Norms. In a scheme for promoting family planning, an incentive of Rs. 400 is being provided for a tubectomy operation, Rs. 500 for a vasectomy operation and Rs. 50 to family planning motivator for each case. In another scheme for employees, Rs.2000 is given to an employee with two or less children, for a sterilization operation.

SAIL has launched HIV/AIDS awareness and control program in partnership with National AIDS Control Organization (NACO), Ministry of Health and Family Welfare. Till date, about Rs.32 million have been received for implementing the policies of NACP-II in all plants/units. Till date, 1.1 Lakh employees and around six Lakh non-employees have been covered under Information, Education & Communication (IEC) Awareness Campaign. SAIL has launched School AIDS Education Programme, covering 111 schools, 3000 teachers and 35,000 students.

4.17 FINANCIAL HIGHLIGHTS OF SAIL

SAIL is India's largest steel producing company. The company is among the seven *Maharatnas* of the country's central Public Sector Enterprises. Some of the major activities indicating the financial highlights of Steel Authority of India Limited are given as follows:

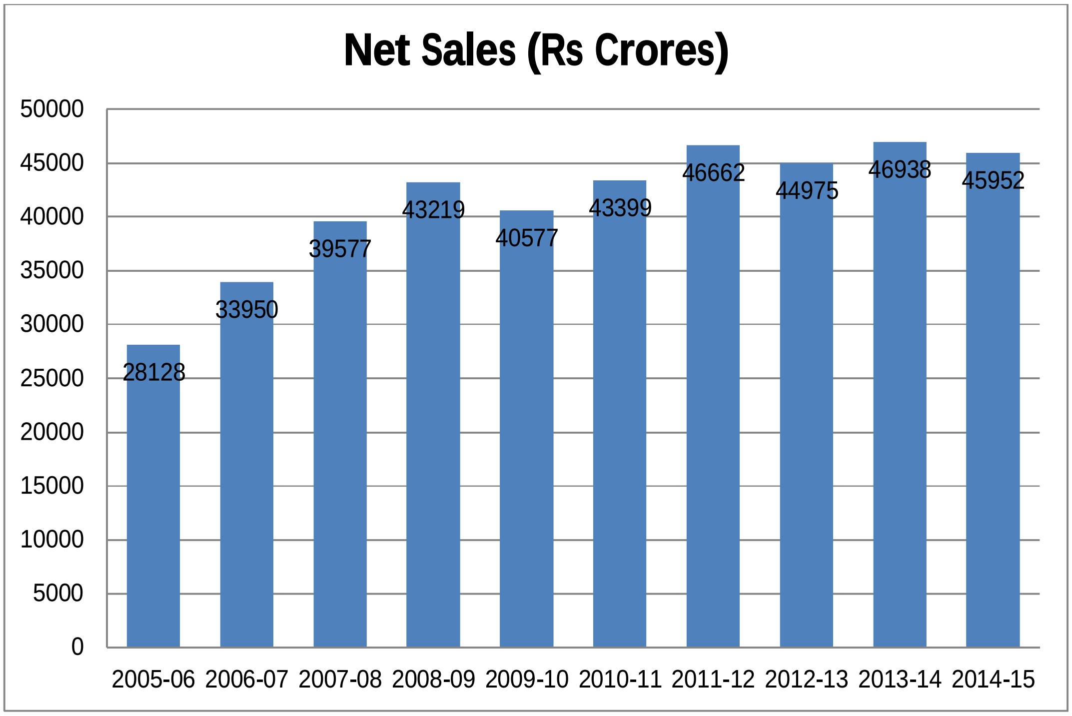
Figure 4.2: Net Worth of Steel Authority of India Limited



Source: *SAIL*

Figure 4.4 depicts net worth of SAIL during 2005 & 2015. It can be seen from figure 4.4 that net worth of SAIL has been in increasing trend during the last decades. Net worth of SAIL has become four times during the study period. Net worth of SAIL increased from Rs. 11011 crores on 31-03-2005 to Rs. 43505 crores on 31-03-2015.

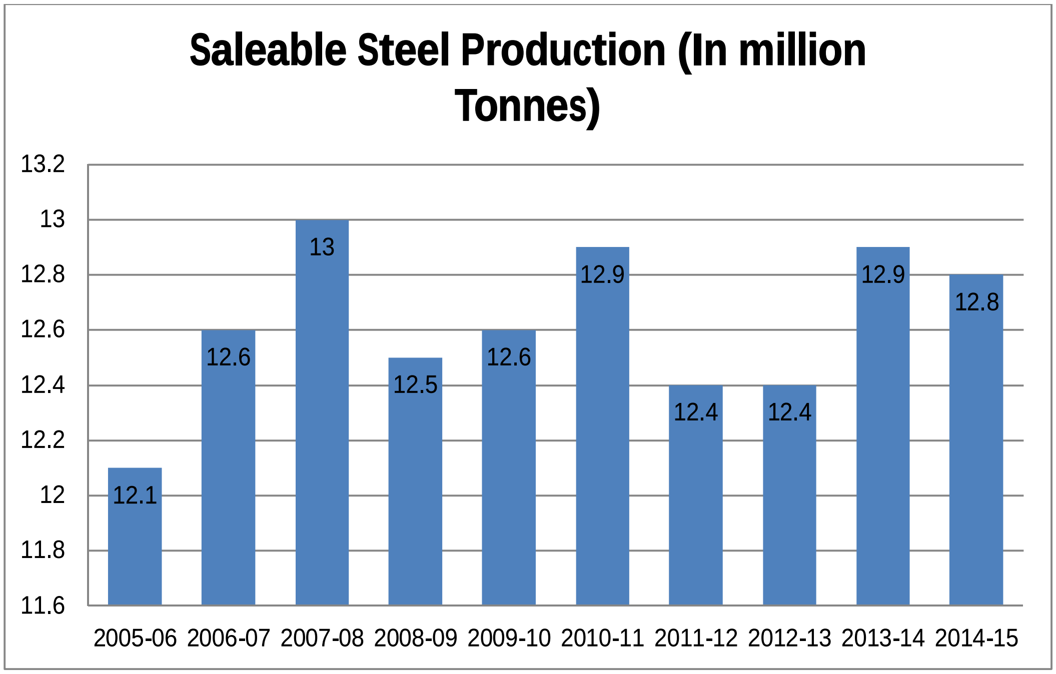
Figure 4.3: Net Sale of SAIL from 2005-06 to 2014-15



Source: *SAIL*

Figure 4.1 demonstrates the net sales trends of SAIL from 2005-06 to 2014-15. Net sales of SAIL have been in a fluctuating trend during the last decades. Net sales of Rs 28128 crores in 2005-06, increased to become Rs 43219 crores in 2008-09. However, SAIL experienced a decline in the net sales in year 2009-10 when the net sales dropped to Rs 40577 crores. This decline was an impact of global economic recession. However, it recovered and rose to Rs 46662 crores in 2011-12. In 2012-13, it again declined to Rs 44975 due to slow demand condition in the economy, but rose to Rs 46938 in 2013-14 and again declined to Rs 45952 in last year of the study.

Figure 4.4: Saleable Steel production of SAIL from 2005-06 to 2014-15



Source: *SAIL*

As depicted in figure 4.4 saleable steel production of SAIL has been in fluctuating trend during study period. Saleable steel production increased from 12.1 MT in 2005-06 to 13.0 MT in 2007-08. Due to economic recession, saleable steel production declined to 12.5 MT in 2008-09. However, production of saleable steel recovered to become 12.9 MT in 2010-11. It again dropped to 12.4 MT in 2012-13 due to slow economic condition in the economy. Production of saleable steel increased to 12.9 MT in 2013-14 but again dropped to 12.8 MT in the last year of the study.

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Chapter – 5

Financial Performance Analysis - Conceptual Framework

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Financial Performance Analysis - Conceptual Framework

5.0 INTRODUCTION

The basic aim of every business organization is to earn satisfactory returns on the funds invested in it. A business must earns profit to meet various expenses like wages & salary of workers, maintenance of machinery and buildings, paying interest for the debt and to provide return to the owners of the business. A business cannot survive for long without earning any profit. In the words of Keynes (as cited in Gupta and Sharma, 2011), "profit is the engine that drives the business enterprise". Profit making is very much important for a business enterprise to ensure it's financially sound and stable position. Another variant of profit is profitability which signifies the economic efficiency of the business and leads to efficient allocation of resources, as resources are tend to be directed to the uses which are the most desirable in terms of profitability (Khan & Jain, 2011). However, profit maximization or profitability maximization has been criticized and has been considered as inadequate objective of financial management while the wealth maximization has been considered as an appropriate objective of financial management and single substitute of shareholders' utility (Gupta & Sharma, 2011). There are two important issues related to the value maximization i.e. Economic value Added (EVA) and focus on interest of stakeholders (Customers, suppliers, creditors, owners etc.), (Khan & Jain, 2011).

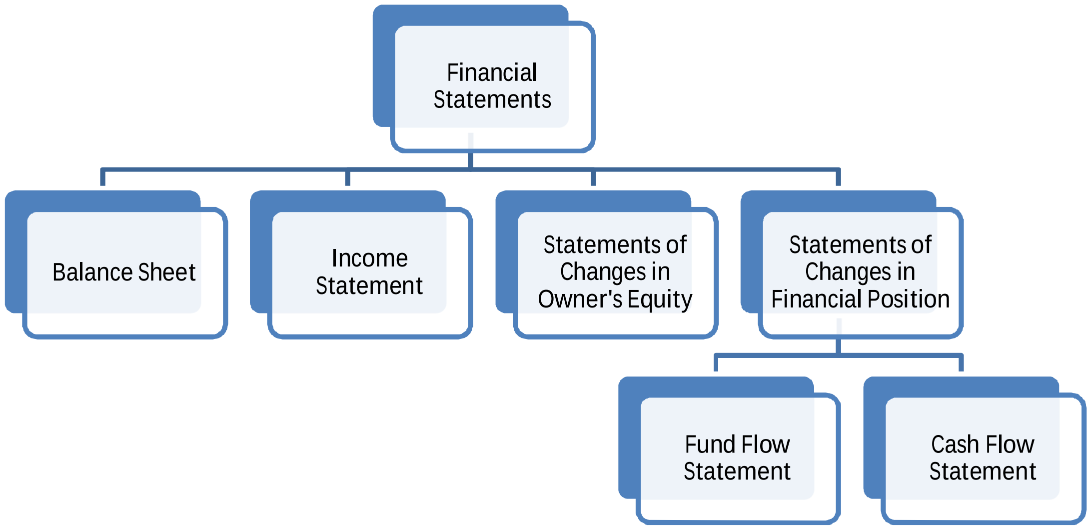
Financial analysis or analysis and interpretation of financial statement refers to the process of determining financial strength and weakness of the firm by establishing strategic relationship between items of balance sheet, profit & loss account and other operative data (Gupta & Sharma, 2011). An evaluation is done from time to time to assess the efficiency of operations and the profitability of the organization. This evaluation is called financial analysis or financial performance analysis.

Financial statements are sources of information on the basis of which conclusions are drawn about the profitability and financial position of the concern. Financial statement are the basis for decision making by the management as well as all other outsiders who are interested in the affairs of the firm such as investors, creditors, customers, suppliers, financial institutions, employees, potential investors, government and general public. But the information available in the financial statement in not an end itself as no meaningful conclusion can be drawn from these statements alone. However, the information provided in the financial statements is of immense use in making decisions through analysis and interpretation of financial statements. A financial analyst makes use of information available in financial statements of a business entity and other reports to evaluate financial performance of the business entity (Gupta & Sharma, 2011). Various tools and techniques are used for analyzing the financial statements of a business entity that have been discussed in detail in the present chapter. The present chapter deals with conceptual framework of financial performance analysis.

5.1 MEANING & TYPES OF FINANCIAL STATEMENTS

Financial statements are used by the management as well as other outsider for decision making. A financial statement is an organized collection of data according to logical and consistent accounting procedures. Its purpose is to convey an understanding of some financial aspects of a business firm. It may show a position at a moment of time as in the case of a Balance Sheet, or may reveal a series of activities over a given period of time, as in the case of an Income Statement (Hampton John J. cited in Sharma & Gupta, 2011). Generally, the term 'financial statements' refers to two basic statements: the Balance Sheet and the Income Statement. According to John N. Myer (cited in Sharma & Gupta, 2011), "The financial statements provide a summary of the accounts of a business enterprise, the balance sheet reflecting the assets, liabilities and capitals as on a certain date and the income statement showing the results of operation during a certain period". Financial statements are also called as financial reports. In the words of Anthony (cited in Sharma & Gupta, 2011) "financial statements, essentially are interim reports, presented annually and reflects a division of the life of an enterprise into more or less arbitrary accounting period-more frequently a year." A brief explanation of types of financial statement is discussed below (Gupta and Sharma, 2011).

Figure 5.1: Types of Financial Statement



Source: *Gupta & Sharma, 2011*

1. Balance Sheet: The Balance Sheet shows the financial position (condition) of the firm at a given point of time. It provides a snapshot and may be regarded as a static picture. Balance sheet is a summary of a firm's financial position on a given date that shows:

Total assets = Total liabilities + Owner's equity

2. Income Statement: Income statement is prepared to determine the operational position of a business. The income statement reflects the performance of the firm over a period of time. It is a statement of revenues earned and expenses incurred to earn that revenue.

3. Statements of Changes in Owners' Equity: The statement of changes in owners' equity shows the beginning balance of each owner's equity account, the reasons for increase or decrease in each and its ending balance.

4. Statements of changes in financial position: For a better understanding of financial position of a business, another statement called statement of changes in financial position has to be prepared to show the changes in assets and liabilities from the end of one period to the end of another period of time.

a. Fund Flow Statement: The word 'Fund' denotes working capital. This statement shows sources from which funds are received and the uses to which these have been put.

b. Cash flow statement: A statement of changes in the financial position of a firm on cash basis is called Cash flow statement.

However, financial statements do not reveal all the information related to the financial operations of a firm, but they furnish some extremely useful information, which highlights two important factors, profitability and financial soundness. Thus analysis of financial statements is an important aid to financial performance analysis.

5.2 MEANING OF FINANCIAL PERFORMANCE

According to BusinessDictionary.com (n.d), Performance is "The accomplishment of a given task measured against preset known standards of accuracy, completeness, cost, and speed. In a contract, performance is deemed to be the fulfillment of an obligation, in a manner that releases the performer from all liabilities under the contract".

Performance is evaluated both on financial and non-financial achievements of business. Financial performance is understood in terms of various financial ratios, which are divided as profit performance measures and investment performance measures. Investopeadia defines financial performance as "A subjective measure of how well a firm can use assets from its primary mode of business and generate revenues. This term is also used as a general measure of a firm's overall financial health over a given period of time, and can be used to compare similar firms across the same industry or to compare industries or sectors in aggregation". In financial performance, different mathematical measures are used to evaluate how well a company is using its resources to make profit ("Financial performance", 2009). Non-financial measures include a range of indicators with orientation of customers, growth, and value to the community and societies.

5.3 MEANING OF FINANCIAL ANALYSIS

Financial analysis or analysis and interpretation of financial statements means the process of determining financial strengths and weaknesses of the firms by establishing strategic relationship between the items of the balance sheet, profit and loss account and other operative data.

According to Metcalf and Titard (Cited in Gupta and Sharma, 2011), “It is a process of evaluating the relationship between component parts of a financial statement to obtain a better understanding of a firm’s position and performance”. In the words of Myers (Cited in Gupta and Sharma, 2011), “financial statement analysis is largely a study of relationship among the various financial factors in a business as disclosed by a single set of statements, and a study of the trend of these factors as shown in a series of statements”. The purpose of financial analysis is to diagnose the information contained in financial statements so as to judge the profitability and financial soundness of the firm (Gupta and Sharma, 2011). Financial analysis involves selection of relevant information from the financial statement, to arrange the selected information to highlight significant relationship and to interpret, draw inferences and make conclusions (Khan & Jain, 2011).

Financial statement analysis is an attempt to determine the significance and meaning of the financial statement to forecast the future earnings, ability to pay interest and debt maturities (both current and long term) and profitability of a sound dividend policy (Kenedy and Mcmuller as cited in Gupta & Sharma, 2011).

The term ‘financial statement analysis’ includes both ‘analysis’ and ‘interpretation’. A distinction should therefore be made between the two terms. While the term ‘analysis’ is used to mean the simplification of the financial data by methodical classification of the data given in the financial statements, ‘interpretation’ mean ‘explaining the meaning and significance of the data so simplified’. However, both ‘analysis’ and interpretation’ are interlinked and complimentary to each other. Analysis is useless without interpretation and interpretation is difficult or even impossible without analysis.

5.3.1 Importance of financial analysis

The purpose of financial analysis depends upon the objective of the user of financial statements. Some objectives of the financial statement analysis, to bring its importance, are given below.

1. Helps in judging the operational efficiency of the business.
2. Helps in evaluating Return on Investment.
3. Indicates the trend of achievements.
4. Helps in assessing the growth potential of the business.
5. Provides measurement of the profitability.
6. Used in intra firm and inter firm comparison of the performance.
7. Helps in forecasting, budgeting and deciding future line of action.
8. Gives simplified, systematic and intelligible presentation of facts.
9. Pinpoints strengths and weaknesses.

5.3.2 Limitations of financial analysis

Financial analysis is a powerful mechanism of determining financial strengths and weaknesses of a firm. But, the analysis is based on the information available in the financial statements. Thus, the financial analysis suffers from serious inherent limitations of financial statements. Financial statements suffer from variety of weaknesses such as,

1. Balance sheet is prepared on historical record of the value of assets.
2. Absence of standard universally accepted terminology.
3. Price level changes are ignored.
4. Financial analysis is based on monetary information where non monetary or qualitative information is ignored.
5. Financial statements are affected by window dressing.
6. Financial statements are affected by the personal ability and bias of analyst.
7. Misleading results in the absence of absolute data.
8. Financial analysis is only a tool, not the final remedy.
9. Financial analysis spotted the symptoms but does not arrive at diagnosis.

5.3.3 Parties Interested in Financial Analysis

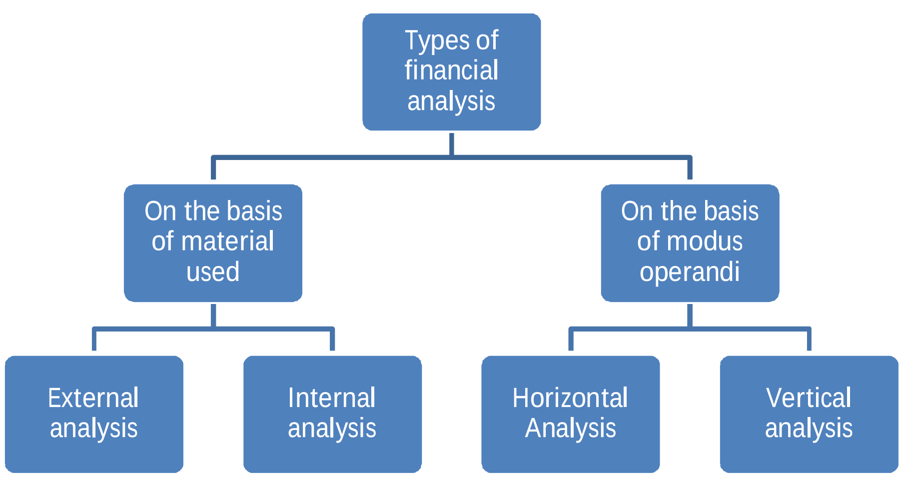
Financial statement analysis is useful to different parties to obtain the required information about the organization. Following are the parties interested in financial statement analysis (Gupta & Sharma, 2011).

1. Investors or Potential Investors
2. Management
3. Creditors or suppliers
4. Bankers and financial institution
5. Employees
6. Government
7. Trade associates
8. Stock exchanges
9. Economists and researcher
10. Taxation authorities

5.3.4 Types of financial Analysis

On the basis of material and method of operation followed in analysis, financial analysis is classified into different categories as shown below (Gupta & Sharma, 2011).

Figure 5.2: Types of financial analysis



Source: *Gupta & Sharma, 2011*

1. On the basis of material used

On the basis of material used, financial analysis can be of two types: External analysis & Internal analysis.

A. External Analysis: This analysis is done by outsiders who do not have access to the detail internal accounting records of the business firm. These Outsiders include investors, potential investors, creditors, potential creditors, credit agencies, government agencies, and the general public. These parties generally obtain data for analysis from the published financial statements.

B. Internal Analysis: This analysis is conducted by the person who has access to the internal accounting records of a business firm. It is performed by internal analysts such as executives, employees, government officials, etc.

2. On the basis of modus operandi

On the basis of the method of operation followed in the analysis, financial analysis can also be of two types: Horizontal Analysis and Vertical Analysis.

A. Horizontal Analysis: It refers to the comparison of financial data of a company for several years. In horizontal analysis figures are presented horizontally over a number of columns and are compared with a standard figure or base year. It is a dynamic analysis. Comparative statement s are the form of horizontal analysis.

B. Vertical Analysis: In vertical analysis, the figures from financial statement of a year are compared with a base selected from the same year's statement. Since this sort of analysis examines relationships between different components for a given point of time and does not shed light on changing behaviour of the above relationships, it is also regarded as 'Static Analysis'. Common-size statements are the form of vertical analysis.

In addition to the above financial analysis, some other types of financial analysis are used as discussed below.

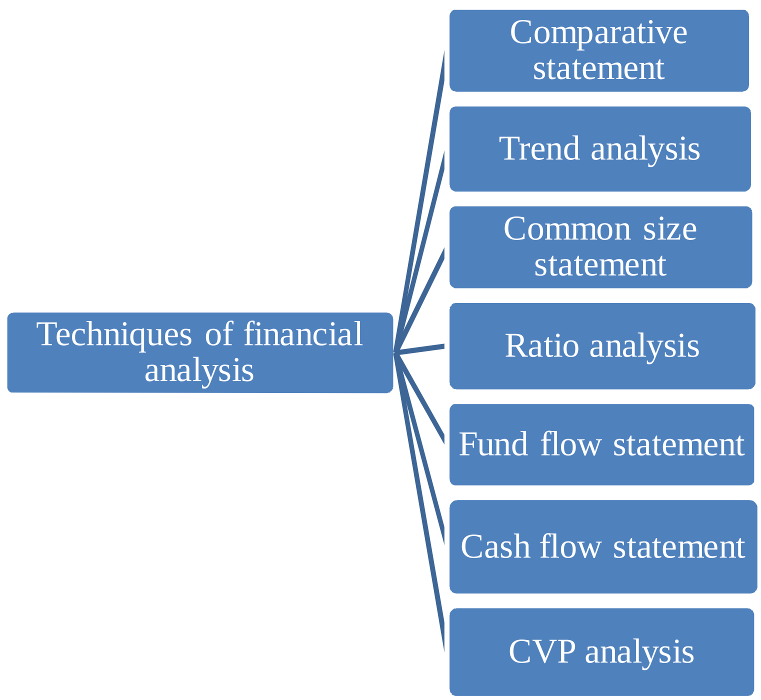
3. On the basis of entities involved: On the basis of entities involved in the analysis, financial analysis can be of two types, Cross sectional or inter-firm analysis and Time series or intra-firm analysis.

4. On the basis of time horizon or objective of analysis: On this basis, financial analysis can be of two types: Short-term analysis and Long-term analysis

5.4 TECHNIQUES/TOOLS OF FINANCIAL PERFORMANCE ANALYSIS:

Various techniques generally used in financial analysis are discussed below (Gupta& Sharma, 2011).

Figure 5.3: Techniques of Financial Analysis



Source: *Gupta & Sharma, 2011*

5.4.1 Comparative Statements

Comparative financial statements are statements of financial position at different period of time. The elements of financial position are shown in a comparative form so as to give an idea of financial position at two or more periods. Any statement prepared in a comparative form is a comparative statement. Generally two statement, balance sheet and income statement are prepared in comparative form for financial analysis. A comparative statement may be in the form of Absolute figures, Increase or decrease in absolute figure, Absolute data in percentage form or Increase or decrease in percentage.

Financial statements may be compared when same accounting principles are used to prepare these statements. Any deviation in accounting principle must be mentioned as footnotes. The two comparative statements are: Balance sheet and Income statement.

A. Comparative Balance Sheet

The comparative balance sheet analysis is the study of the comparison of the same items, group of items and computed items in of two financial year's balance sheets of the same business enterprise on different dates. The comparative balance sheet has two columns for data of original balance sheets; third column is used to show difference in the figures, a fourth column may also be added to show percentage of change. The aspects which are expected to be studied from a comparative balance sheet statement are: *Current financial position and liquidity position, Long term financial position and Profitability of the concern.*

B. Comparative Income Statement

The comparative income statement gives an idea of the progress of a business for two accounting period. The income statement discloses net profit or net loss on account of operations. The changes in absolute data in money values and percentage can be determined to analyze the profitability of the business. Income statement also has four columns, two columns for data of original statements, third column to show difference in figures and fourth column for percentage change. Analysis of comparative income statement involves following steps:

- The increase or decrease in sales should be compared with increase or decrease in cost of goods sold. The amount of gross profit should be studied.
- The operating expenses should be deducted from gross profit to find out operating profits.

- Non-operating expenses should be deducted and non-operating income should be added to find out net profit. It gives an idea about overall profitability.
- An opinion should be formed whether the overall profitability is good or bad.

5.4.2 Trend Analysis

Trend analysis is also named as horizontal analysis, because each accounting variable is placed horizontally. This method determines the direction upwards and downwards and involves the computation of the percentage relationship that each statement item bears to the same item in base year. In trend analysis, the information for a number of years is taken and one year which is generally a base year is taken as base year. The figure of base year is taken as 100 and trend ratios for other years are calculated on the basis of base year. The base should be carefully selected. The base period should be a normal period. Following steps are followed to calculate trends,

- One year, generally first year, is taken as base year.
- The figure for base year is taken as 100.
- Trend percentages are calculated in relation to base year.

5.4.3 Common Size Statement

In common-size statements the figures in balance sheet and income statement are shown as percentage of total assets, total liabilities and total sales. The total assets are taken as 100 and different assets are expressed as a percentage of total assets. The total liabilities are taken as 100 and different liabilities are expressed as percentage of it. In this way the analyst is able to assess the figures in relation to total values (Khan & Jain, 2011). Common Size Comparative Statements prepared for one firm over the years highlight the relative changes in each group of expenses, assets and liabilities. These statements can be equally useful for inter firm comparisons, given the fact that absolute figures of two firms of the same industry are not comparable. The Common Size Statements may be prepared in the following way:

- The totals of assets or liabilities are taken as 100.
- The individual assets are expressed as a percentage of total assets.

A. Common Size Balance Sheet

A statement in which balance sheet items are expressed as the ratio of each asset to total assets and the ratio of each liability is expressed as a ratio of total liabilities is called Common-Size Balance Sheet. This type of financial statement can be used to allow for easy analysis between companies or between time periods of a company. The common-size balance sheet can be used to compare companies of differing size.

B. Common Size Income Statement

A common-size income statement is a statement in which each account is expressed as a percentage of the value of sales. This type of financial statement can be used to allow for easy analysis between companies or between time periods of a company. Common Size Income Statement analysis allows an analyst to determine how the various components of the income statement affect a company's profit.

5.4.4 Funds Flow Statement

The balance sheet and income statement are the traditional basic financial statement of a business enterprise. A serious limitation of these statements is that they do not provide information regarding changes in the firm's financial position from the end of one period of time to the end of another period of time. Therefore, another statement has to be prepared to show the change in the assets and liabilities from end of one period of time to the end of another period of time. This statement of change in financial position is funds flow statement. In the words of Foulke, R. A., "A statement of source and application of fund is a technical device designs to analysis the changes in the financial condition of business enterprises between two dates" (cited in Gupta and Sharma, 2011).

The term fund is defined in a number of ways. In a narrow sense, fund means only cash. 'Cash flow statement' portrays net effect of the various business transactions on cash into account receipts & disbursement of cash. But there are many such transactions which do not affect cash but represent the flow of fund e.g. Purchase of furniture on credit. In broader sense the term fund means all financial resources used in the business, whether in the form of men, money, material, machine & others. In a popular sense 'funds' means Net working capital or difference between current assets and current liabilities. Funds generally refer to cash or cash equivalent or to working capital.

The term 'flow' refers to movement and includes both inflow and outflow. The term 'flow of funds' means transfer of economic values from one asset to another. Flows of fund take place when any transaction makes change in the amount of fund available before happening of the transaction.

5.4.5 Cash Flow Statement

The balance sheet and profit & loss account provide the essential basic information on financial activities of a business but these statements do not disclose the causes for changes in the assets and liabilities between two different points of time. Therefore fund flow statement is prepared, but fund flow statement suffered from certain limitations and the need aroused to prepared cash flow statement. The objectives of the cash flow statement as given in AS-3 are as under:

> "Information about the cash flows of an enterprise is useful in providing users of financial statements with a basis to assess the ability of the enterprise to generate cash and cash equivalents and the needs of the enterprise to utilize those cash flows. The economic decisions that are taken by users require an evaluation of the ability of an enterprise to generate cash and cash equivalents and the timing and certainty of their generation. The statement deals with the provision of information about the historical changes in cash and cash equivalents of an enterprise by means of a cash statement which classified cash flows during the period from operating, investing and financing activities."

Cash flow statement is a statement which describes the inflows (sources) and outflows (uses) of cash and cash equivalents in an enterprise during a specified period of time. It is appropriately termed as *"where got where gone statement"* (Khan & Jain, 2011). A cash flow statement summarizes the causes of changes in cash position of a business enterprise between dates of two balance sheets.

According to AS-3, the cash flow statement should report cash flows during the period classified into three main categories:

1. Cash flows from operating activities.
2. Cash flows from investing activities.
3. Cash flows from financing activities.

The basic information required for the preparation of a cash flow statement is obtained from the following three sources:

1. Comparative balance sheets at two points of time.
2. Income statement of the current accounting period.
3. Some selected additional data to extract the hidden transactions.

5.4.6 Ratio Analysis

A ratio is a simple arithmetical expression of the relationship of one number to another. According to accountant's handbook by Wixon, Kell and Bedford (as cited in Gupta & Sharma, 2011), a ratio "is an expression of the quantitative relationship between two numbers". A financial ratio is a comparison between one bit of financial information and another. In financial analysis, a ratio is used as an index or yardstick for evaluating the financial position and performance of firm. The relationship between two accounting figures, expressed mathematically, is known as a financial ratio (or simply as a ratio). The point to note is that a ratio indicates a quantitative relationship, which can be, in turn, used to make a qualitative judgment.

5.4.6.1 Basis of Comparison of ratios

The use of financial ratios as a tool of financial analysis involves their comparison as a single ratio (Like an absolute figure) Fail to reveals the true financial position Therefore, four types of comparison are involves (Khan & Jain, 2011).

1. Trend ratios
2. Inter-firm comparison
3. Comparison of items within a single year's financial statement of a firm
4. Comparison with standards or plans.

Ratio analysis is a technique of analysis and interpretation of financial statements for helping in making certain decisions. But ratio analysis is not an end itself, calculation of mere ratios does not serve any purpose unless several appropriate ratios are analyzed and interpreted.

5.4.6.2 Uses and significance of accounting ratios

The Ratio analysis is one of the most powerful tools of the financial analysis. Some important uses of accounting ratios are as follows (Gupta & Sharma, 2011).

- Facilitate in decision making
- Trend analysis of ratio reveals the direction of movement, that is, whether the movement is favourable or unfavourable.
- Aids in forecasting and budgeting
- Helps in communicating financial strengths and weaknesses of a firm
- Measurement of the profitability
- Helps in coordination as better communication of efficiency and weakness, results in better coordination in the enterprise.
- Enable both intra firm and inter firm comparison
- Helps in control by comparing actual ratios with standard ratios and by taking corrective action if any variance or deviation is found.
- Utility to shareholders/investors/government/employees/creditors

5.4.6.3 Limitations of ratio analysis

The ratio analysis is one of the most powerful tools of financial management. The ratios though are easy to calculate and understand, Accounting ratios suffer from the following limitations.

- In case, financial statements are incorrect, ratios calculated will also be false and defective.
- A number of ratios have to be calculated for a better understanding as a single ratio may not convey much of a sense.
- Different people may interpret the same ratio in different ways.
- Window dressing restricts the utility of ratio analysis.
- The technique is complicated and complex far beyond the understanding of ordinary businessmen.

- A change in the price level can seriously affect the validity of comparisons of ratios computed for different time periods.
- Ratios may give Misleading results in the absence of absolute data.
- Qualitative factors are ignored in ratio analysis.
- Proper standards are not available for every ratio.

5.4.6.4 Functional Classification of Accounting Ratios

In view of the financial management, various ratios are classified as follows:

1. Liquidity Ratios
2. Long Term Solvency and Leverage Ratios
3. Activity Ratios
4. Profitability Ratios

1. Liquidity ratios

Liquidity means ability of an asset to be converted into cash quickly at low cost. It measures a firm's ability to pay its current debts on time. Assets that may be converted into cash in a short period of time are referred to as liquid assets. They are listed in financial statements as current assets. To measure the liquidity of a firm, the following ratios can be calculated:

a. Current Ratio

Current ratio may be defined as the relationship between current assets and current liabilities. This ratio is also known as working capital ratio. The ratio indicates the short term financial soundness of the company. It judges whether current assets are sufficient to meet the current liabilities. The ratio is calculated on the basis of the following formula:-

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

As a convention 2:1 is referred to as a banker rule of thumb or arbitrary standard of liquidity for a firm. In case it is very high, it will show the idleness of funds. If it is very low it will indicate short term financial scarcity.

b. Quick or Acid Test or Liquid Ratio

Quick ratio is also known as acid test ratio or liquid assets ratio. This ratio is similar to the current ratio except that the inventories and prepaid expenses are excluded from the current assets because they may not be so easily marketable assets as the liquid assets are. The following formula is used to calculate this ratio:

$$\text{Quick, Liquid or Acid test Ratio} = \frac{\text{Quick or Liquid Assets}}{\text{Current Liabilities}}$$

Sometimes bank overdraft is not included in current liabilities, in such cases,

$$\text{Quick, LiquidorAcidtestRatio} = \frac{\text{Quick or Liquid Assets}}{\text{Quick or Liquid Liabilities}}$$

As a rule of thumb, Liquidity ratio of 1:1 is generally considered satisfactory, as the liquid assets will be considered sufficient to meet the current liabilities.

c. Absolute Liquid Ratio or Cash Ratio

Although receivables, debtors and bills receivables are more liquid than inventories, yet there may be doubt regarding their realization into cash in time. Therefore, some authorities are of the opinion that the absolute liquid ratio should also be calculated. A company's most liquid assets are its holdings of cash and marketable securities. That is why analysts also look at the cash ratio. Absolute liquid assets include cash in hand and at bank and marketable securities or temporary investment.

$$\text{AbsoluteLiquidRatio} = \frac{\text{Absolute Liquid Assets}}{\text{Current Liabilities}}$$

OR

$$\text{AbsoluteLiquidRatio} = \frac{\text{Cash \&bank + short term securities}}{\text{Current Liabilities}}$$

The acceptable norm of this ratio is 1:2 or 0.50:1

2. Long term Solvency and Leverage Ratios

The term solvency refers to the ability of a concern to meet its long term obligations which includes debenture holders, financial institutions providing medium and long term loans and other creditors selling goods on installment basis. The long term creditors of the firm are primarily interested in the firm's ability to pay regularly interest on long term borrowings, repayment of the principal amount and the security of their loan.

Leverage has been defined as "the action of a lever, and the mechanical advantages gained by it". The term leverage refers to an increased means of accomplishing some purpose. Leverage ratios help to evaluate business liabilities. Debt is associated with risk, so the more debt the higher the rate of return that will be expected. Leverage ratio measure how much financial leverage the firm has taken on.

I. Capital structure ratios

a. Debt Equity Ratio

The debt to equity ratio tells us how the firm finances its operations with debt relative to the book value of its shareholders equity. The ratio indicates the external equities or outsider fund and internal equities or shareholders fund.

$$\text{Debt Equity Ratio} = \frac{\text{Outsiders' Funds}}{\text{Shareholders' Funds}}$$

A ratio of 1:1 may be usually considered to be a satisfactory ratio although there cannot be any 'rule of thumb' or standard norm for all types of businesses. In some business a high ratio 2:1 or even more may be considered satisfactory.

b. Funded debt to total capitalization ratio

The ratio establishes a relation between the long term funds raised from outsiders and total long term funds available in the business.

$$\text{Funded Debt to Total capitalisation Ratio} = \frac{\text{Funded Debt (long Term Debt)}}{\text{Total capitalisation}}$$

There is no rule of thumb but up to 50% or 55%, the ratio may be tolerable.

c. Proprietary Ratio or Equity Ratio

This ratio, also known as equity ratio, shareholder to total equity ratio or net worth to total assets ratio, establishes the relation between shareholders fund to total assets of the firm.

$$\text{Proprietary Ratio or Equity Ratio} = \frac{\text{Shareholders' funds}}{\text{Total Assets}}$$

Higher the ratio better is the long term solvency position of the firm.

d. Solvency Ratio or the Ratio of Total Liabilities to Total Assets

The ratio establishes the relation between total liabilities to outsiders to total assets of the firm and can be calculated as:

$$\text{Solvency Ratio} = \frac{\text{Total Liabilities to Outsiders}}{\text{Total assets}}$$

Generally, lower the ratio of total liabilities to total assets, more satisfactory or stable is the long term solvency position of the firm.

e. Fixed Assets to Net worth Ratio or Fixed Assets to Proprietor's Funds

The ratio establishes the relationship between fixed assets and shareholders fund.

$$\text{Fixed Assets to Net worth Ratio} = \frac{\text{Fixed Assets (after depreciation)}}{\text{Shareholders' funds}}$$

There is no thumb rule to interpret this ratio but 60 to 65 percent is considered to be satisfactory ratio in case of industrial undertakings.

f. Fixed Assets to Total Long Term Funds or Fixed Assets Ratio

A variant to the ratio of fixed assets to net worth is the ratio of fixed to total long term fund which is calculated as:

$$\text{Fixed Assets Ratio} = \frac{\text{Fixed Assets (After depreciation)}}{\text{Total Long term Funds}}$$

Generally, the ratio should be 100%, in case it exceeds 100%, it implies that the firm has financed a part of the fixed assets out of current funds which is not good financial policy.

g. Ratio of Current Assets to Proprietor's Funds

The ratio is calculated by dividing the total of current assets by the amount of shareholder's funds.

$$\text{Current Assets to Proprietor's Fund} = \frac{\text{Current Assets}}{\text{Shareholders' Funds}}$$

There is no rule of thumb for this ratio. There may be different ratio for different firm depending upon the nature of the firm.

h. Debt Service ratio or Interest Coverage ratio

The ratio is also known as Interest coverage ratio or Coverage ratio or Fixed charges cover or Times interest earned. The ratio is calculated as:

$$\text{Debt Service Ratio} = \frac{\text{Net Profit (before interest and taxes)}}{\text{Fixed interest Charges}}$$

Generally, higher the ratio, more safe are the long term creditors, but a too high interest imply that the firm is not using debt as a source of finance to increase earning of the shareholders.

i. Cash to Debt Service ratio

This ratio is also known as Debt Cash Flow Coverage Ratio.

$$\text{Cash Debt Service Ratio} = \frac{\text{Annual cash flow before interest } \&taxes}{\text{Interset + Sinking Fund Appropriation } \frac{\text{Debt}}{1-\text{tax rate}}}$$

As far as long term solvency of a firm is concerned, higher ratio is better.

j. Capital Gearing Ratio

This ratio makes an analysis of the capital structure of the firm. This ratio shows relationship between equity share capital, (the variable cost bearing) and the fixed cost bearing i.e., preference share capital and debentures. As debenture holders and preference shareholders are paid interest or dividend at fixed rate, so they are known as fixed cost bearing long terms funds. The firm is said to be low geared, if equity capital is more than the debentures and preferences share capital and vice-versa.

$$\text{Capital Gearing Ratio} = \frac{\text{Equity Share Capital} + \text{Reserve \& Surplus}}{\text{Preference Capital} + \text{Long Term Debt}}$$

Gearing should be kept in such a way that the company is able to maintain a steady rate of dividend.

k. Ratio of Total Investment to Long-Term Liabilities:

This Ratio measures the relationship between the total long term funds and the long term liabilities.

$$\text{Total Investment to Long Term Liabilities} = \frac{\text{Shareholders' Fund} + \text{Long Term Liabilities}}{\text{Long Term Liabilities}}$$

As a general rule, proportion of long term liabilities should not be very high.

l. Ratio of Fixed Assets to Funded Debt

The ratio measures the relationship between the fixed assets and the funded debt and is a very useful to the long term creditors. The ratio can be calculated as below:

$$\text{Fixed Assets to Funded Debt} = \frac{\text{Fixed Assets}}{\text{Funded Debt}}$$

m. Ratio of Current Liabilities to Proprietor's Funds

The ratio of current liabilities to proprietor's funds establishes the relationship between current liabilities and the proprietor's funds and indicates the amount of long-term funds raised by the proprietor's as against short term borrowings.

$$\text{Current Liabilites to Proprietor's fund Ratio} = \frac{\text{Current Liabilities}}{\text{Proprietor'sFund}}$$

n. Ratio of Reserve to Equity Capital

The ratio establishes relationship between Reserves and Equity Share Capital. The ratio indicates that how much profits are generally retained by the firm for future growth. Higher the ratio, generally, better is the position of firm.

$$\text{Ratio of Reserve to Equity Capital} = \frac{\text{Reserves}}{\text{Equity Share Capital}}$$

II. Leverages

Leverage may be classified as:

a. Financial Leverage
b. Operating Leverage
c. Combined Leverage

a. Financial Leverage or Trading on Equity

The use of long-term fixed interest bearing debt and preference share capital along the equity share capital is called financial leverage or trading on equity. The long-term fixed interest bearing debt is employed by a firm to earn more from the use of these sources than their cost so as to increase the return on owner's equity. Financial leverage can be calculated as:

$$\text{Financial Leverage} = \frac{\text{Earning Before Interest \& } Tax\ (EBIT)}{\text{Earnings Before Interest \& } Tax - \text{Interest \& } Preference\ Dividend}$$

b. Operating Leverage

It is obtained by dividing contribution (sales minus Variable cost) by EBIT (Earnings Before Interest & Tax).

$$\text{Operating Leverage} = \frac{\text{Contribution}}{\text{Earnings Before Interest} \ \& \ Tax}$$

c. Combined Leverage

Combined leverage is the product of operating leverage and financial leverage. It is a proxy for the total risk of a company. Combined leverage compares changes in revenues with changes in EBT.

Combined Leverage = Operating Leverage × Fixed Charges Leverage

A combined leverage may thus be described as a ratio of marginal contribution to EBT, or as operating leverage multiplied by fixed charges leverages.

3. Activity Ratios

Activity ratios evaluate the efficiency or effectiveness with the firm manages and utilizes its assets. These ratios are also called turnover ratios because they indicate the speed with which assets are converted or turned over into sales. Activity ratios, thus, involve a relationship between sales and assets.

a. Inventory/ Stock Turnover Ratio

Inventory turnover ratio also known as stock indicates whether inventory has been efficiently used or not. The purpose is to see whether only the required minimum funds have been locked up in inventory. Inventory Turnover Ratio (I.T.R) indicates the number of times the stock has been turned over during the period and evaluates the efficiency with which a firm is able to manage its inventory.

$$\text{Inventory Turnover Ratio} = \frac{\text{Cost of Goods Sold}}{\text{Average Inventory at Cost}}$$

$$\text{Avearge Inventory} = \frac{\text{Opening Stock} + \text{Closing Stock}}{2}$$

A high inventory/stock velocity indicates efficient management of inventory because more frequently the stocks are sold, the lesser amount of money is required to finance the inventory. A low inventory turnover ratio indicates an inefficient management of inventory. A low inventory turnover implies over investment in inventories. A too high turnover of inventory may not necessarily always imply a favourable situation. The profits may be low due to excessive cost incurred in replacing stocks in small lots, stock out situations, selling inventories at very low prices, etc.

b. Debtors or Receivable Turnover Ratio and Average Collection Period

These ratios are computed to evaluate the quality of debtors. Debtors turnover ratio indicates the velocity of debt collection of firm.

$$\text{Debtors Turnover Ratio} = \frac{\text{Net Credit Annual Sales}}{\text{Average Trade Debtors}}$$

Trade Debtors = Sundry Debtors + Bills Receivables and Accounts Receivables

Average Trade Debtors = Opening Trade Debtors + Closing Trade Debtors/2

There is no rule of thumb to interpret the ratio. Generally, higher ratio implies efficient management and low ratio implies inefficient management. The average collection period represents the average number of days for which a firm has to wait before its receivables are converted into cash. The ratio can be calculated as follows:

$$\text{Average Collection Period} = \frac{\text{Average Trade Debtors}}{\text{Sales Per Day}}$$

$$\text{Average Collection Period} = \frac{\text{Number of Working Days}}{\text{Debtors Turnover Ratio}}$$

Generally, the shorter the average collection period the better is the quality of debtors while a higher collection period implies as inefficient collection performance.

c. Creditors/Payables Turnover Ratio

This ratio indicates the speed with which the payments for credit purchases are made to the creditors. The ratio can be computed as follows:

$$\text{Creditors Turnover Ratio} = \frac{\text{Net Credit Annual Purchases}}{\text{Average Trade Creditors}}$$

Generally, higher creditor's velocity is better and lower creditor's velocity is less favourable.

$$\text{Average Payment Period} = \frac{\text{Number of Working Days}}{\text{Creditors Turnover Ratio}}$$

A shorter payment period indicates prompt payments to creditors. But a very short payment period may be an indication that the company is not taking full advantage of the credit terms allowed by suppliers.

d. Working Capital Turnover Ratio

This ratio measures the efficiency with which the working capital is being used. A higher ratio indicates efficient utilization of working capital and a low ratio indicates otherwise. But a very high working capital turnover ratio is not a good situation for any firm and hence care must be taken while interpreting the ratio. This ratio can be calculated as: (Gupta and Sharma: 2005)

$$\text{Working Capital Turnover Ratio} = \frac{\text{Cost of Sales}}{\text{Average Working Capital}}$$

$$\text{Average Working Capital} = \frac{\text{Opening Working Capital} + \text{Closing Working Capital}}{2}$$

4. Profitability Ratios

Profit earning is essential for survival of the business. A business needs profits not only for its existence but also for its expansion and diversification. Profitability ratios are calculated either in relation to sales or in relation to investment. The following are the important profitability ratios:

I. General Profitability Ratios

The following ratios are known as general profitability ratios:

a. Gross Profit Ratio

This ratio measures the relationship between the gross profit and net sales. This ratio shows the margin of profit on sales. It is calculated as:

$$\text{Gross Profit Ratio} = \frac{\text{Gross Profit}}{\text{Net Sales}} \times 100$$

There is no standard norm for judging the gross profit ratio, however, the gross profit should be adequate to cover operating expenses and to provide for fixed charges, dividends and building up of reserves. Therefore higher Gross Profit Ratio implies better results.

b. Net Profit Ratio:

Net Profit Ratio establishes the relation between Net profit and sales. This ratio is the overall measure of firm's profitability. It is calculated as:

$$\text{Net Profit Ratio} = \frac{\text{Net profit after Tax}}{\text{Net Sales}} \times 100$$

Higher the ratio the better is the profitability, but the performance of the profit must also be seen in relation to investments of the firm while interpreting the ratio.

c. Operating Ratio

This ratio is a complementary of net profit ratio. Operating ratio throw light on the operational efficiency and profitability of a concern. Operating ratio establishes the relationship between cost of goods and other operating expenses on the one hand and the sales on the other. The ratio is calculated as:

$$\text{Operating Ratio} = \frac{\text{Operating Cost}}{\text{Net Sales}} \times 100$$

$$\text{Operating Ratio} = \frac{\text{Cost of goods sold + Operating Expenses}}{\text{Net Sales}} \times 100$$

This ratio is the test of the operational efficiency with which the business is being carried. The operating ratio should be low enough to leave a portion of sales to give a fair return to the investors.

d. Operating Profit Ratio

This Ratio is calculated by dividing operating profit by sales.

$$\text{Operating Profit Ratio} = \frac{\text{Operating Profit}}{\text{Net Sales}} \times 100$$

OR, Operating Profit Ratio = 100 – Operating Ratio

Operating Profit = Net Sales – Operating Cost

e. Expenses Ratio

Expenses ratio establishes the relationship between various expenses to net sales. The operating ratio reveals the average total variations in expenses. Expenses ratios are calculated as:

$$\text{Particular Expenses Ratio} = \frac{\text{Particular Expense}}{\text{Net Sales}} \times 100$$

The lower the ratio, the greater is the profitability and higher the ratio, lower is the profitability.

f. Cash Profit Ratio

The net profits of a firm are affected by the amount/ method of depreciation charged. Further, depreciation being non-cash expenses, it is better to calculate cash profit ratio. This ratio measures the relationship between cash generated from operation and the net sales.

$$\text{Cash Profit Ratio} = \frac{\text{Cash Profit}}{\text{Net Sales}} \times 100$$

Where, cash profit = Net Profit + Depreciation

II. Over All Profitability Ratios

Following are the important overall profitability ratios.

a. Return on Shareholders' Investment or Net Worth

Return on Shareholders' Investment is the relationship between net profits (after interest and tax) and the proprietor's funds. It is popularly known as ROI or Return on Shareholder/ Proprietors Funds.

$$\text{Return on Shareholders}'\text{Investmentt} = \frac{\text{Net Profit (after interest \&tax)}}{\text{Shareholders}'\text{ Fund}}$$

As the primary objective of business is to maximize its earning, this ratio indicates the extent to which this primary objective of business is being achieved. As this ratio reveals how well the resources of a firm are being used, higher the ratio, better are the results.

b. Return on Equity Capital

Return on Equity Capital is the relationship between profits of a company and its equity capital. It can be calculated as:

$$\text{Return on Equity Capital} = \frac{\text{Net Profit After Tax} - \text{Preference Dividend}}{\text{Equity Share Capital (paid up)}}$$

Interpretation of ratio is similar to the interpretation of return on shareholders' investments and higher the ratio, better it is.

c. Earnings Per Shares (E.P.S)

Earnings Per Share is calculated by dividing the net profit after taxes and preference dividend by total number of equity shares.

$$\text{Earnings Per Share} = \frac{\text{Net Profit After Tax} - \text{Preference Dividend}}{\text{No. of Equity Shares}}$$

The Earnings Per Share helps in determining the market price of the equity shares of the company. A comparison of earnings per share of the company with another will also help in deciding whether the equity share capital is being effectively used or not. It also helps in estimating the company's capacity to pay dividend to its equity shareholders.

d. Return on Capital Employed (ROCE)

The profit for the purpose of calculating return on capital employed should be computed according to the concept of 'capital employed' used. The profits taken must be the profits earned on the capital employed in the business.

$$\text{Return on Gross Capital employed} = \frac{\text{Earning Before Interest \& Tax}}{\text{Gross Capital Employed}}$$

$$\text{Return on Net Capital employed} = \frac{\text{Earning Before Interest \& Tax}}{\text{Net Capital Employed}}$$

Gross Capital Employed = Fixed Assets + Current Assets

Net Capital Employed = Total Assets – Current Liabilities

Return on capital employed measures the efficiency of the business and helps in evaluation of different departments. It may help in devising future business policies for expansion or diversification etc. The borrowing policy of the enterprise may be properly formulated. The rate of interest on borrowings should always be less than the return on capital employed.

e. Capital Turnover Ratio

Capital turnover ratio establishes the relationship between cost of goods sold and the capital employed. Sale is used in calculation of capital turnover ratio when information about cost of goods sold is not available. This ratio ensures whether the capital employed has been effectively used or not. Higher total capital turnover ratio is always in the interest of the company. The ratio is measured as:

$$\text{Capital Turnover Ratio} = \frac{\text{Cost of Goods Sold or Sales}}{\text{Capital employed}}$$

The ratio reflects the efficiency in the utilization of capital. Higher capital turnover ratio is good for the business.

f. Return on Assets

This ratio is also known as ROA. It is the relationship between not profit (after taxes) and assets employed to earn that profit. It is calculated as:

$$\text{Return on Assets} = \frac{\text{Net profit after tax}}{\text{Average Total assets}}$$

or,

$$\text{Return on Assets} = \frac{\text{Net profit after tax}}{\text{Average Tangible assets}}$$

or,

$$\text{Return on Assets} = \frac{\text{Net profit after tax}}{\text{Average fixed assets}}$$

5.Market Test or Valuation Ratios

a. Dividend Yield Ratio

Dividend yield ratio is calculated to evaluate the relationship between dividend per share paid and the market value of the share.

$$\text{Dividend Yield Ratio} = \frac{\text{Dividend per equity share}}{\text{Market value per share}}$$

b. Dividend Payout Ratio

This ratio is calculated to find out what portions of the earnings per share have been used for paying dividends and how much has been retained for ploughing back into the working of the company. It is an important ratio because ploughing back of profits enables a company to grow and pay more dividends in future.

$$\text{Dividend Pay} - \text{out Ratio} = \frac{\text{Dividend per equity share}}{\text{Earnings per share}}$$

c. Price-Earnings Ratio or P/E Ratio

This ratio indicates the number of times the earning per share is covered by its market price. This is calculated according to the following formula:

$$\text{Price Earning Ratio} = \frac{\text{Market price per equity share}}{\text{Earnings per share}}$$

Generally, higher the price-earnings ratio, the better it is.

d. Earnings Yield Ratio

This ratio also shows a relationship between earnings per share and market value of share. It can be calculated as follows:

$$\text{Earnings Yield Ratio} = \frac{\text{Earnings per Share}}{\text{Market price per share}} \text{ x } 100$$

e. Market Value to Book Value Ratio

Market value to book ratio is the relationship between market value per share of a firm and its book value per share. It is calculated as:

$$\text{Market value to Book Value Ratio} = \frac{\text{Market Value per share}}{\text{Book Value per share}}$$

$$\text{Book Value per share} = \frac{\text{Equity share Capital} + \text{reserves \&surpluses} - \text{Accumulated Loss}}{\text{Total Number of equity share}}$$

f. Market Price to Cash Flow Ratio

It is the relationship between the market price per share of a firm and its cash flow per share. It is calculated as:

$$\text{Market Price to Cash flow} = \frac{\text{Market price per share}}{\text{Cash flow per share}}$$

$$\text{Cash flow Per share} = \frac{\text{Profit + Depreciation}}{\text{Total Number of equity shares}}$$

It indicates the ability of the firm to payback. Lower the Market price to cash flow shorter is the payback period.

5.5 CONCEPT OF ECONOMIC VALUE ADDED (EVA)

There is no single accounting based measure upon which one can rely to explain changes in shareholder wealth (Chen and Dodd, 1997 & Lehn and Makhija, 1997). A recent innovation in the field of financial performance analysis is a trade-marked variant of residual income known as Economic Value Added (EVA®). Stern Stewart & Co. is credited for the concept of Economic Value Added (EVA). Stern Stewart and Co. (as cited in Worthington & West, 2001) argues:

> *Earnings, earnings per share, and earnings growth are misleading measures of corporate performance and the best practical periodic performance measure is economic value-added. EVA is the financial performance measure that comes closer than any other to capturing the true economic profit of an enterprise. EVA also is the performance measure most directly linked to the creation of shareholder wealth overtime.*

EVA is the value created in excess of the required return of the company's investors. EVA is the profit earned by the firm less the cost of financing the firm's capital which shows a firm's economic profit. It is a popular measure currently being used by several firms to determine whether an existing/proposed investment positively contributes to the owners'/shareholders' wealth (Khan & Jain, 2011). Business Dictionary defines EVA as "After tax profit that exceeds the required minimum return on capital. Computed by deducting the cost of capital (both debt and equity) from the after-tax profit, it is said to be the best measure of the true profitability of an enterprise, and is tied to cash flow and not to earnings per share (EPS)".Many studies have been conducted in the last two decades, to answer which is better to measure the financial performance of corporations, value-based measures or traditional accounting performance measures, or which financial performance measure best explains change of shareholder value in corporations. The results of the studies are quite mixed and controversial (Kumar & Sharma, 2011). Many studies have supported EVA as a better measure for firm performance & as better measure for change in shareholder value (Milunovich and Tsuei, 1996; Uyemura et al., 1996; O'Byrne, 1996; Worthington and West, 2001; Ismail 2008). However, many studies have also supported traditional performance measures over EVA (Biddle et al., 1998; Chen and Dodd, 2001; Kim, 2006; Maditinos et al., 2009). Economic value is created when the return on the firm's economic capital employed is greater than the cost of that capital. There are two important differences between conventional accounting measures of profit and EVA. Firstly, EVA considers the cost of all capital unlike the net income figure reported in the Profit and Loss Account which consider only the most visible type of capital cost i.e. interest, and completely ignores the cost of equity capital as reflected by the shareholders‟ required return on common stock. Proponents of EVA argue that measures of performance that overlook such costs can not reveal the actual view of company's value creation/addition. Secondly, it is not constrained by Generally Accepted Accounting Principles (GAAP).

EVA is an estimate of true economic profit, or the amount by which earnings fall short of the required minimum rate of return that shareholders and lenders could get by investing in other securities of comparable risk. In conventional accounting, accounting profit is derived after deducting interest charges whereas EVA is derived after subtracting cost of all capital that includes debt, preference and equity capital.

Stewart identified a number of potential distortions present in the GAAP based accounting and developed around 160 adjustments to be made in the financial statements to reflect economic profits and economic capital. In practice, however, many researchers and EVA proponents have found 8-10 adjustments such as,

- Non-recurring Income and Expenditure
- Research & Development
- Goodwill
- Interest
- Non-interest bearing current liabilities (NIBCLs)
- Cash Operating Taxes

- Adjustments for deferred Tax Reserve;
- Last-in-First-Out (LIFO) Reserve;

However, due to non-applicability of adjustment, non-availability of data and in order to avoid complexity in the calculation, following two adjustments have been made in the present study.

- Interest
- Non-interest bearing current liabilities (NIBCLs)

5.5.1 Computation of EVA

The Economic Value Added of a company is computed by deducting the overall cost of capital from its adjusted NOPAT figure. If such adjusted profits of a company are more than its overall cost of capital employed, the company is said to be successful in creating shareholders' wealth (i.e. positive EVA Company). On the other hand, a company is regarded as a wealth destroyer (i.e. negative EVA Company) if it's overall cost of capital is more than its adjusted profits. In case, EVA is zero, it should be considered as the sufficient achievement as company has earned a return that is at least sufficient to cover up its overall cost of capital**.** It is calculated as:

EVA= Net Operating Profit after Taxes − WACC × Capital Employed

Three components are required to calculate EVA,

1. Net operating profit after tax (NOPAT),
2. Capital employed, and
3. The weighted average cost of capital (WACC)

Operating profit after taxes (NOPAT) can be calculated, but can usually be easily found on the corporation's income statement. Capital employed, is the amount of money used to fund a particular project. The weighted-average cost of capital (WACC) also needed to be calculated

5.5.2 Computation of NOPAT and Economic Capital

For the purpose of the present study, NOPAT has been calculated as:

NOPAT = EBIT (1-T)

Where,

EBIT = Earnings before interest and tax

T = Corporate tax rate

Whereas, Economic Capital has been calculated as:

Economic Capital = Total assets - NIBCLs

Where,

NIBCLs = Non Interest bearing current liabilities

5.5.3 Computation of Weighted Average Cost of Capital (WACC)

Generally, WACC constitutes four components namely cost of equity, cost of preference shares, cost of debt and cost of retained earnings. In this study, retained earnings form part of the equity capital and SAIL has no preference shares. Hence, no separate cost is calculated for retained earnings and preference shares. WACC is defined as the total returns demanded by debt and equity investors, weighted against the proportion of their share in the target capital structure of the company. The detailed discussion of each of these components is given below:

5.5.3.1 Cost of Equity (*ke*)

There are several methods to calculate this component of WACC like dividend discount model, premium over long term debt model, capital asset pricing model (CAPM) etc. Out of these, CAPM uses the market as a bench mark for estimating the cost of equity capital. It assumes that the cost of equity is simply a risk free rate of return plus a premium that investors require to take an additional market risk.

Moreover, Stewart also preferred CAPM among all the other methods available for the calculation of cost of equity. As per CAPM, cost of equity capital is calculated as:

$$Rj = Rf + (Rm - Rf) * \beta j$$

Where,

Rj= Expected return on security *j*

Rf= Risk- free rate

Rm = Market rate of return

Rm – Rf= Risk Premium

βi= Beta i.e. sensitivity of the return on scrip *j* to the changes in the market index.

The components of cost of equity have been discussed below in detail.

- ***Risk Free Rate (Rf)***

The risk-free rate of return is a theoretical rate of return on an investment with no risk i.e. where both the return of the original capital and the payment of interest are completely certain. In practice, however, the risk-free rate does not technically exist; even the safest investments carry a very small amount of risk. Thus, investors commonly use the interest rate on treasury bills or govt. securities as a proxy for the risk-free rate because it is assumed that government-issued securities have virtually zero risk of default. In the present study, weighted average of the central govt. securities has been taken as a proxy for the risk free rate.

- ***Market Return (R_m)***

It is the average return of the market as a whole, which is normally the return of the stock exchange on which shares are traded. Hence, in the present study, R_m has been calculated as the simple average of daily return on BSE Sensex for the period from April 2005 to March 2015. The Market return is calculated as:

$$Rm = \frac{\text{Closing Value of Sensex on day t} - \text{Closing Value of Sensex on day t} - 1}{\text{Closing Value of Sensex on day t} - 1}$$

- ***Risk Premium***

The market return minus the risk free rate is called market risk premium that represents the expectations of the shareholders over and above the risk free rate. This market premium is then multiplied by the beta factor and added to the risk free rate to determine the cost of equity. In the present study, market risk premium is calculated as

$$\text{Market Risk Premium} = R_m - R_f,$$

- ***Beta (β)***

Being a systematic risk factor, beta measures the returns of a company's shares relative to the returns of the market. If the returns of a company move in harmony with the market and shows exactly the same volatility as the returns of the market, it is regarded as an average risk company with $\beta = 1$ as market beta is always equal to one. A company falls in the above average risk category, if its returns are more volatile than those of market i.e. beta being greater than one ($\beta > 1$). On the contrary, a company is said to be a below average risk company i.e. with beta being less than one ($\beta < 1$), if its returns are less volatile than that of market. Moreover, negative beta ($\beta < 1$) is also possible but not likely. It indicates that stock is moving in the opposite direction from the market. For the purpose of the study, beta values have been calculated on the basis of daily returns of both, the individual security and of BSE Sensex. R_m is same as discussed above. Daily returns on the individual security are calculated as:

$$Ri = \frac{\text{Closing Value of Security on day t} - \text{Closing Value of Security on day t} - 1}{\text{Closing Value of Security on day t} - 1}$$

Beta coefficient has been calculated as:

$$\beta_j = Cov_{im}/\sigma^2_m$$

Where,

Cov_{im} = Covariance between security return and market return and

σ^2_m = variance of market return.

5.5.3.2 Cost of Debt (*kd*)

The after tax cost of debt is simply the bond's yield to maturity times one minus the firm's marginal tax rate. Since, interest on debt is tax deductible, this adjustment must be made to properly reflect the true cost of debt component. Hence, cost of debt has been calculated as:

$$Kd = \frac{\text{Total Interest Expenses} \times (1 - \text{Effective Tax Rate})}{\text{Average Total Borrowings}} \times 100$$

5.5.3.3 Weighted Average Cost of Capital (WACC)

After calculating all the cost components, finally the overall cost of capital is calculated as:

$$\text{Overall Cost of Capital} = \text{WACC} \times \text{Economic Capital}$$

Further,

$$\text{WACC} = ke \times we + kd \times wd$$

Where,

Ke= cost of equity shareholders‟ funds

Kd= cost of debt

we = book value proportion of average shareholders' funds

wd = book value proportion of average total borrowings

WACC, hence, uses the financing side of the balance sheet in the form of the targeted debt to capital ratio that provides a basis for weighing the cost.

5.6 CONCEPT OF MARKET VALUE ADDED

Market Value Added (MVA) is a tool to measure shareholders' value at a particular moment. This was introduced by Stewart in 1991. Market value added (MVA) means the difference between the current market value of a firm and the capital contributed by investors. According to Gupta & Kundu (2008) Market Value Added (MVA) is the additional market capitalization over and above the book value of equity. If MVA is positive, the firm has added value. If it is negative, the firm has destroyed value. Market value less than the cost of invested capital imply that management has not performed well to create value with the fund made available to it by the investors ("Market value added", n.d.). Investopeadia defines market value added as "A calculation that shows the difference between the market value of a company and the capital contributed by investors ("Market value added", n.d). In other words, it is the sum of all capital claims held against the company plus the market value of debt and equity.

From an investor's point of view, MVA is the best final measure of a Company's performance. Stewart (1991) states that MVA is a cumulative measure of corporate performance and that it represents the stock market's assessment from a particular time onwards of the net present value of all a Company's past and projected capital projects. MVA is calculated at a given moment, but in order to assess performance over time, the difference or change in MVA from one date to the next can be determined to see whether value has been created or destroyed.

The Market Value Added (MVA) measure is based on the assumption that the total market value of a firm is the sum of the market value of its equity and the market value of its debt. Stewart (1991) defines Market Value Added (MVA) as the excess of market value of capital (both debt and equity) over the book value of capital. In another words Market Value Added (MVA) is the difference between the current market value of a firm (V) and the capital contributed by its investors (K):

$$\text{Market Value Added (MVA)} = V - K$$

The capital is the amount that is put in the Company by the shareholders. According to Stern and Shiely (2001), in order to calculate the market value of a firm, we have to value the equity part at its market price on the date the calculation is made. The total investment in the Company since day one is then calculated as the interest-bearing debt and equity, which includes retained earnings. Present market value is then compared with total investment. If the former amount is greater than the latter, the Company has created wealth.

5.6.1 Calculation of Market Value Added (MVA)

Market Value Added (MVA) is the difference between the total market value of the Company and the economic capital. A Company's total market value is equal to the sum of the market value of its equity and the market value of its debt. Following steps are followed to derive market value added of a firm.

1. Multiply the total of all common shares outstanding by their market price
2. Multiply the total of all preferred shares outstanding by their market price
3. Combine these totals
4. Subtract the amount of capital invested in the business

Market value added is calculated as:

Market Value Added= (Number of common shares outstanding x share price) + (Number of preferred shares outstanding x share price) – Book value of invested capital

Or, Market Value Added = Market Value - Capital Invested

MVA =MV - IC

Where;

MV: Market Value of Company

EC: Invested Capital

MVA: Market Value Added

MVA is calculated at a given moment, but in order to assess performance over time, the difference or change in MVA from one date to the next can be determined to see whether value has been created or destroyed.

The link between EVA and MVA is that MVA is the present value of all the future EVAs a Company is expected to generate, discounted at the WACC.

Market Value Added (MVA) = PV (EVA)

On the assumption that the expected future growth in EVA will be at a constant rate, the theoretical MVA can be calculated

MVA = PV (future EVA)

Market Value Added (MVA) = current EVA / WACC

Where,

PV: Present Value

EVA: Economic Value Added

WACC: Weighted Average Cost of Capital

5.7 TECHNIQUES OF FINANCIAL PERFORMANCE ANALYSIS USED IN THE PRESENT STUDY:

The data used to assess the financial performance of Steel authority of India Ltd have been obtained from the Annual reports of Steel Authority of India Ltd. However, data from annual statements have been supplemented with other secondary data wherever needed and found useful. In the present study, financial ratios under various categories have been calculated, analyzed, interpreted and inferences have been drawn regarding financial position of SAIL during the study period. Selection of ratios has been made according to their relevance for present study and their popularity in literature. Economic Value added and Market Value added have also been calculated, and analyzed.

5.8 CHAPTER SUMMARY

The above discussion on the concept of financial performance analysis clearly reveals that the financial performance analysis is concerned with the analysis of financial statements of the companies. The main purpose of this analysis is to evaluate past performance, financial position, liquidity position, future prospects for earnings, ability to pay interest and debt on maturity and profitability of a concern. Interest of various related groups is affected by the financial performance of a firm. The performance appraisal identifies the financial strengths and weaknesses of the companies by properly establishing relationships between the items of the profit and loss account and balance sheet. The first task is to select the information relevant to the decision under consideration from the total information contained in the financial statements. The second is to arrange the information in a way to highlight significant relationships. The final is interpretation and drawing of inferences and conclusions. In short, performance analysis is the process of selection, relation, and evaluation.

After having discussed the conceptual framework of performance appraisal including its importance, limitations, purpose, various tools and techniques used to analyze the financial performance of an organization, the next chapter would deal with Data analysis and Interpretation.

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Chapter - 6

Data Analysis & Interpretation

Chapter – 6

Data Analysis and Interpretation

6.0 INTRODUCTION

In the Previous chapter, concept of financial performance analysis has been discussed in detail. In the present chapter, the data have been analyzed with the help of suitable tools and techniques to assess the financial strength and to estimate the financial Performance of Steel Authority of India Ltd. In the present study, the focus has been made on ratio analysis, Economic Value Added (EVA) analysis and Market Value Added (MVA) analysis. A comparison has also been made between Financial Ratios of SAIL and Industry average financial ratios. Required statistical tools have been used for the analysis to achieve the objectives of the study. The results have been presented in the form of tables along with interpretationsin the following pages.

In the present study collected datawere tabulated in E-Views-7 for the purpose of analyses and hypotheses testing. For analyzing the data both simple and advanced statistical tools have been used. Data have been analyzed with validated tools and procedure. In some cases simple statistics like average, percentage etc have been calculated while advance statistical tools like one sample t-test, correlation and multiple linear regression has also been used. Multiple linear regressions analysis has been applied to assess the relationship of performance measures (ROCE, EVA and MVA) with various determinants. One sample t test was employed to compare financial ratios of SAIL with their Industry averages ratios. Significance test has been used to decide whether to accept or reject the null hypotheses. 95% (or 5% level of significance) has been taken as level of confidence.

The chapter is divided into nine sections: 6.1 Ratio analysis, 6.2 Comparisons of SAIL’s financial Ratios with Industry average financial ratios, 6.3 Economic Value Added analyses, 6.4 Market Value Added analysis, 6.5 Descriptive statistics of dependent & independent variables in OLS models, 6.6 Pre testing results, 6.7 Results of analysis, 6.8 Conclusion and 6.9 Chapter Summary

6.1 RATIO ANALYSIS

According to accountants' handbook by Wixon, Kell & Bedford (as cited in Sharma & Gupta, 2011), a ratio "is an expression of the quantitative relationship between two numbers". The Ratio analysis is one of the most powerful tools of the financial analysis. It is used as a device to analyze and interpret the financial health of enterprise. Many studies have used ratio analyses to analyze financial performance business firms (Pal, 2013; Takeh & Navaprabha 2015; Bhunia and Brahma 2009; Pratheepkanth, 2011; Chandrashekaran et. at. 2013). In the present section of the study, trends of ratios under different categories have been examined over the period of study.

6.1.1 Profitability Ratio Analysis

The table 6.1 exhibits profitability ratios of SAIL during study period.

Table 6.1: Profitability Ratios of SAIL from 2005-06 to 2014-15

(In per cent)

Years	Gross Profit Ratio (GPR)	Operating profit Ratio (OPR)	Net Profit Ratio (NPR)	Return on Equity (ROE)	Return on Assets (ROA)	Return on Capital Employed (ROCE)
2005-06	36.37	11.79	13.72	36.77	13.93	34.51
2006-07	40.88	18.00	17.41	41.50	17.41	41.48
2007-08	45.29	18.53	18.09	37.27	15.53	33.49
2008-09	37.85	10.37	13.63	24.15	11.21	24.34
2009-10	39.60	17.80	15.80	22.03	10.84	23.61
2010-11	41.58	14.43	11.17	14.06	6.75	14.72
2011-12	37.16	10.72	7.44	9.23	4.59	10.73
2012-13	38.85	8.59	5.06	5.69	2.82	7.02
2013-14	38.67	4.94	5.55	6.25	2.94	6.84
2014-15	41.60	6.61	4.60	4.93	2.21	6.08

Source: *Calculated from Financial Reports of SAIL*

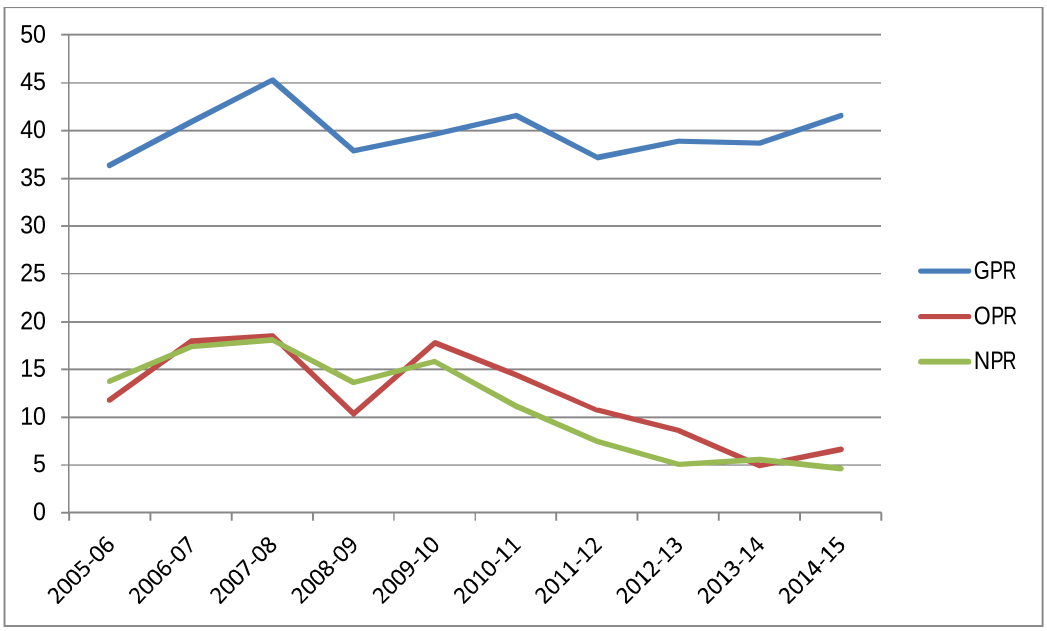
Noted: *GPR = Gross Profit Ratio, OPR = Operating Profit Ratio, NPR = Net Profit Ratio, ROE = Return on Equity, ROA = Return on Assets, ROCE = Return on Capital Employed*

As can be seen from table 6.1 & figure 6.1, the gross profit ratio of the SAIL has been in fluctuating trend during study period. The GPR was highest in the year 2007-08 (45.29 %) and it was lowest in the year 2005-06 (36.37 %). In 2005-06, GPR was

36.37 % which rose to become 45.29 % in the year 2007-2008. However, in 2008-09, gross profit ratio declined to become 37.85 %. GPR increased to become 39.60 % and 41.58 % in the year 2009-10 and 2010-11, respectively. In 2011-12 gross, profit ratio again declined to 37.16 % and increased to 41.60 % in the year 2014-15.

As far as Operating profit ratio of SAIL is concerned, table 6.1 & figure 6.1 shows that the OPR of the company has been in decreasing trend during study period. During the study period, OPR was highest in the year 2007-08 (18.53 %) while it was lowest in the year 2013-14 (4.94 %). SAIL experienced a considerable declined in the operating profit ratio in the year 2008-09 (10.37 %). In 2009-10, the OPR rose to become 17.80 % but after that it showed a decreasing trend from the year 2010-11(14.43 %) to 2013-14 (4.94 %) with a slight increase in the year 2014-15 (6.61 %). It reveals declining operating efficiency of the company during the study period.

Figure 6.1: General Profitability Ratios of SAIL from 2005-06 to 2014-15



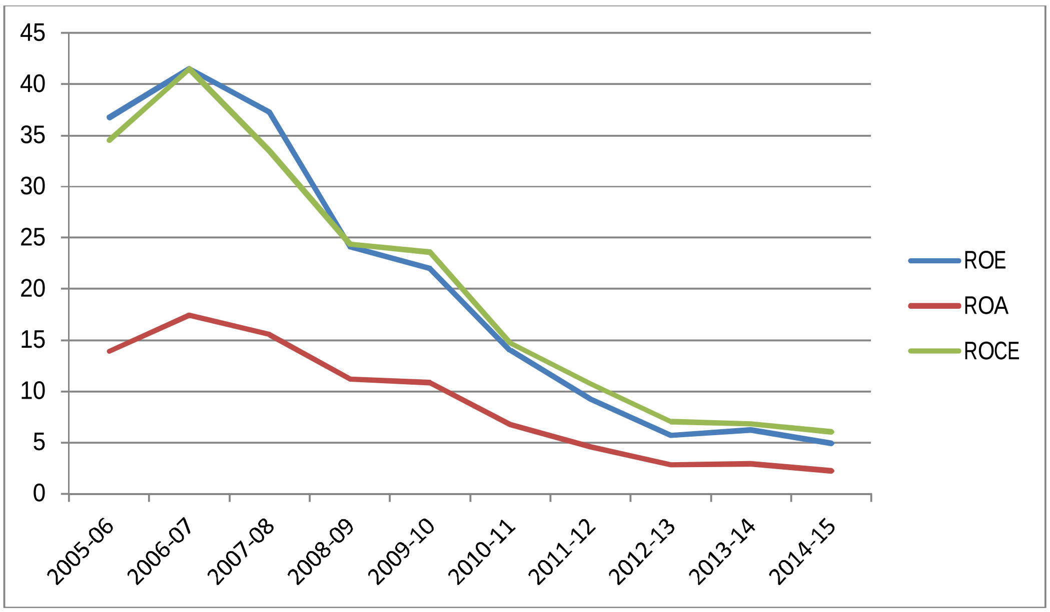
Source: *Calculated from Financial Reports of SAIL*

Note: *GPR = Gross Profit Ratio, OPR = Operating Profit Ratio, NPR = Net Profit Ratio.*

Table 6.1 and figure 6.1 gives a clear picture of Net profit ratio for ten years from 2005-06 to 2014-15. From figure 6.1, it can be seen that the Net Profit Ratio of the company has been in decreasing trend during study period. NPR of SAIL increases in the initial years from 2005-06 (13.72 %) to 2007-2008 (18.09 %). In the year 2008-

09, the ratio declined to become 13.63 % which further improved to 15.80 % in 2009-10. But after that NPR showed a decreasing trend from 2010-11 (11.17 %) to 2014-15 (4.60 %) except in the year 2013-14 (5.55 %). NPR of SAIL reveals declining management's efficiency of the company in operating the business successfully during study period.

Figure 6.2: Overall Profitability Ratios of SAILfrom 2005-06 to 2014-15



Source: *Calculated from Financial Reports of SAIL*

Note: *ROE = Return on Equity, ROA = Return on Assets, ROCE = Return on Capital Employed*

Table 6.1 and figure 6.2 depicts Return on assets (ROA) of the company during the study period. ROA was maximum (17.41%) in 2006-2007 and it was minimum (2.21%) in 2014-15 among all the years of the study. ROA was 13.93% in the year 2005-2006 which rose to 17.41% in 2006-07 and declined in the year 2007-08 (15.53 %). However, ROA has been in decreasing trend from 2008-09 (11.21 %) to 2014-15 (2.21 %). It indicates that the company has not utilized the assets efficiently during the study period.

The Table 6.1 and figure 6.2 also reveal that the Return on Shareholders' Equity Ratio was 36.77 % in the year 2005-06 which rose to become 41.50 % in the year 2006-07. However, ROE showed a decreasing trend from the year 2007-08 (37.27 %) to the year 2014-15 (4.93 %) except in the year 2013-14 (6.25 %). It can be noted that the ratio showed a very sharp decline in last years of study. Therefore, the ROE was very low (4.93 %) in the final year of the study. It is an indication of very low return on shareholders' equity.

Table 6.1 and figure 6.2 also indicates that ROCE has been in decreasing trend from 2005-06 (34.51 %) to 2014-2015 (6.08 %) except the year 2006-2007 (41.48 %). ROCE in the year 2006-2007 rose due to the efficient use of capital employed. ROCE of the company was much lower (6.08 %) in the final year 2014-15 compared to previous years of study periodindicating decreasing profitability of the company.

6.1.2 Liquidity Ratio analysis

Table 6.2 and figure 6.3 show liquidity ratios of SAIL. Table 6.2 gives current ratio of SAIL for ten years from 2005-06 to 2014-15. The standard ratio for current ratio is 2:1. But the company has shown a Lower Current Ratio over the period of study except from 2006-07 to 2009-10. The current ratio of SAIL (except from 2006-2007 to 2009-10) has been less than 2:1 during study period. The mean value of current ratio of SAIL was 1.57 times during study period, indicating that the liquidity position of the company was not satisfactory during the study period.

Table 6.2: Liquidity Ratios of SAIL from 2005-06 to 2014-15

(In times)

Year	Current Ratio (CR)	Liquid Ratio (LR)	Cash Ratio (CsR)
2005-06	1.47	0.88	0.90
2006-07	1.98	1.48	1.03
2007-08	1.98	1.47	1.03
2008-09	2.03	1.44	1.06
2009-10	2.26	1.75	1.28
2010-11	1.51	1.05	0.72
2011-12	1.49	0.79	0.35
2012-13	1.23	0.53	0.18
2013-14	0.95	0.42	0.11
2014-15	0.83	0.32	0.07

Source: *Calculated from Financial Reports of SAIL*

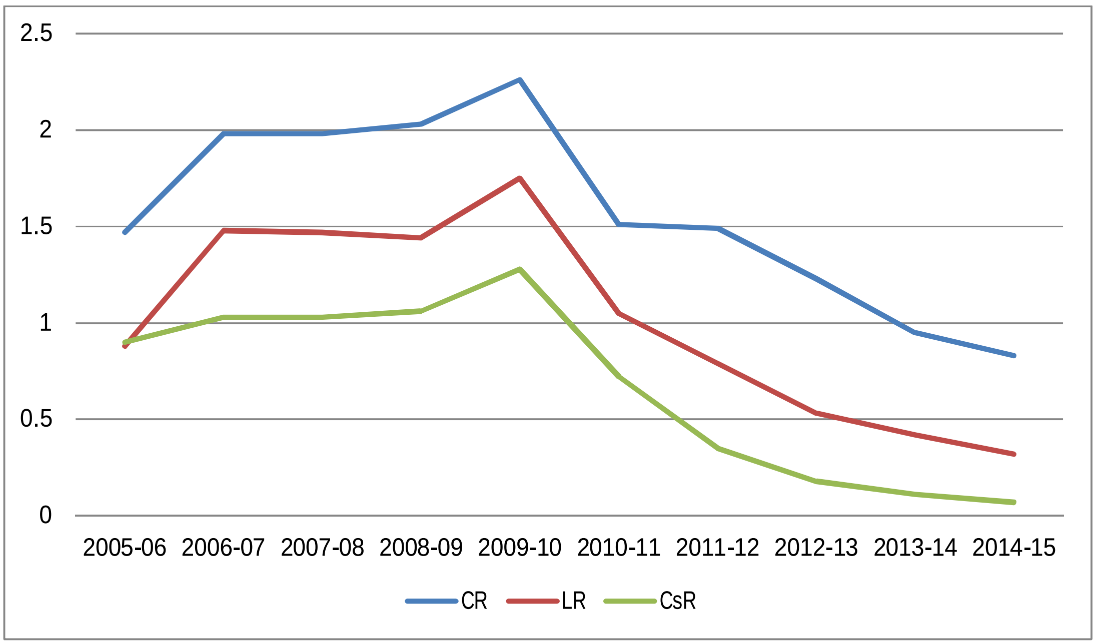
Note:*CR = Current Ratio, LR = Liquidity ratio, CsR = Cash Ratio*

Table 6.2 also reveals the Liquid ratio of the company under study. The liquid ratio showed a decreasing trend during the period of study. Standard ratio for Liquid Ratio is 1:1. SAIL has shown a high value for LR in initial years of study, with highest value (1.75 times) in the year 2009-10 and least value (0.32 times) in 2014-15. However, mean value of liquid ratio is satisfactory (1.01 times) but the company should revise the liquidity position.

Cash Ratio has also shown decreasing trend over the period of study except in the year 2009-10 (1.28 times).

The above data can be represented with the help of following figure 6.3.

Figure 6.3: Liquidity Ratios of SAILfrom 2005-06 to 2014-15



Source: *Calculated from Financial Reports of SAIL*

Note: *CR = Current Ratio, LR = Liquidity ratio, CsR = Cash Ratio*

6.1.3 Solvency Ratio analysis

Table 6.3 and figure 6.4 indicates Debt-Equity ratio of SAIL from 2005-06 to 2014-15. The above table indicates that Debt to Equity ratio of SAIL has been more than 1:1 during the period of the study except for the years 2008-09 (0.97 times) & 2011-12 (0.95 times), indicating that total liabilities was higher than owners' equity and the external lenders and creditors were bearing more risk. The average Debt to Equity ratio of the company has been 1.18 times during the period of study indicating that the company has been financially leveraged during study period. Therefore, it can be concluded that the Debt to Equity position of the company was satisfactory during study period as this proportion is acceptable for a manufacturing company.

As can be seen from table 6.3 and figure 6.4, the Interest Coverage Ratio of the company was highly satisfactory in the initial years of the study. Interest coverage ratio was 12.94 times in the year 2005-06 which rose to 45.68 times in the year 2007-08. However, ICR of SAIL decreased from 2008-09 (37.15 times) to 2014-15 (2.61 times), indicating decreasing earning capacity of SAIL and excessive use of debt during these years. It is a warning sign for the company that the company may not have the ability to offer assured payment of interest to the lenders in the future.

Table 6.3: Solvency Ratios of SAIL from 2005-06 to 2014-15

(In times)

Years	Debt Equity Ratio (DER)	Interest Coverage Ratio (ICR)	Solvency Ratio (SR)	Capital Gearing Ratio (CGR)
2005-06	1.33	12.94	0.57	2.75
2006-07	1.42	28.64	0.59	3.77
2007-08	1.38	45.68	0.58	5.99
2008-09	0.97	37.15	0.49	3.27
2009-10	1.09	22.73	0.52	1.91
2010-11	1.08	13.68	0.52	3.77
2011-12	0.95	7.79	0.49	3.25
2012-13	1.08	5.09	0.52	2.94
2013-14	1.17	4.20	0.54	3.06
2014-15	1.29	2.61	0.56	3.06

Source: *Calculated from Financial Reports of SAIL*

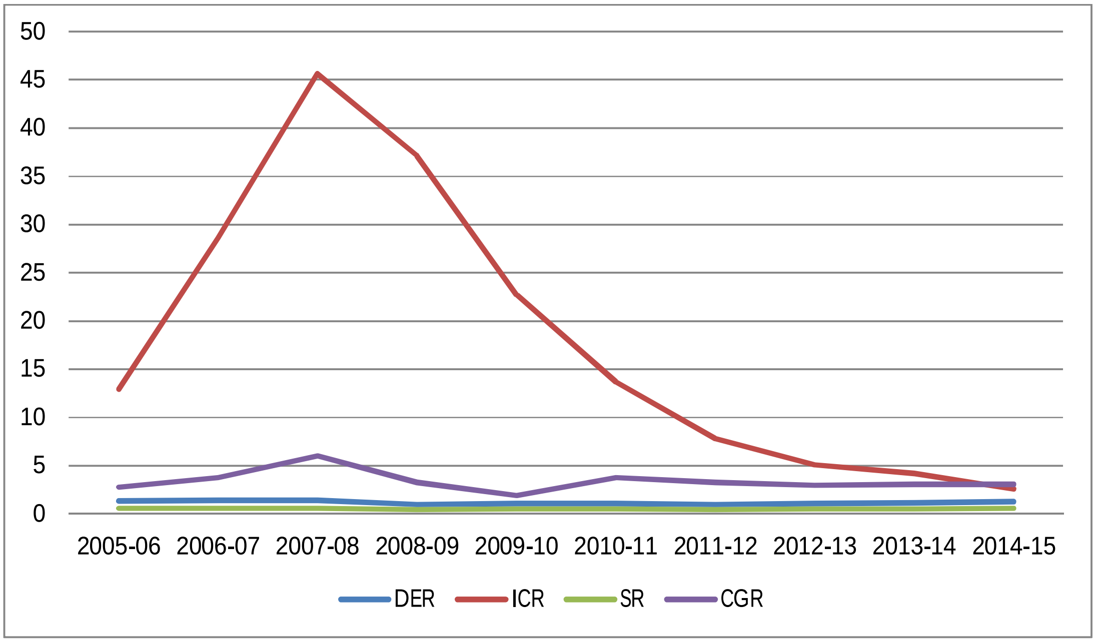
Note: *DER = Debt to Equity Ratio, ICR = Interest Coverage Ratio, SR = Solvency Ratio, CGR = Capital Gearing Ratio*

The table 6.3 and figure 6.4 also show the solvency ratio of SAIL from the year 2005-06 to 2014-15. Solvency ratio of SAIL has been in a fluctuating trend during the period of the study. The solvency ratio shows the proportion of assets needs to repay the debts. The lower ratio indicates lower risk and greater safety to the owners. Table 6.3 shows capital gearing ratio of SAIL for a period of ten years from 2005-06 to 2014-15. Capital gearing ratio is the measure of capital structure analysis and financial strength of the company. Capital gearing ratio of SAIL has been in a fluctuating trend during the period of the study. The average value of ratio (3.38

times) which indicates that SAIL had lower long term debt than equity during the period of the study.

The above data can be represented with the help of following figure 6.4.

Figure 6.4: Solvency Ratios of SAIL from 2005-06 to 2014-15



Source: *Calculated from Financial Reports of SAIL*

Note: *DER = Debt to Equity Ratio, ICR = Interest Coverage Ratio, SR = Solvency Ratio, CGR = Capital Gearing Ratio*

6.1.4 Management efficiency Ratios

Table 6.4 and figure 6.5 reveal the management efficiency ratio of the company under study. Working capital turnover ratio has been in fluctuating trend during the period of the study. The ratio was 6.97 in 2005-06 which declined to 2.16 in the year 2009-10. However, it again rose to 6.32 in the year 2012-13. In the year 2013-14, WTR was exceptionally very high (24.0) which became negative in 2014-15 (-13.17), indicating a very low maintenance of working capital during last years of the study.

Table 6.4 and figure 6.5 also show Total assets turnover ratio of SAIL for a period of ten years from 2005-06 to 2014-15. The ratio was 1.0 times in 2005-06, indicating the sale was almost equal to total assets of the company. In the year 2007-08, TATR declined to 0.76 times. In the year 2008-09 it rose to 0.82 times but again declined to become 0.57 times in 2010-11. Total assets turnover ratio rose to 0.61times in 2011-

12 but showed a decreasing trend from 2012-13 (0.53 times) to 2014-15 (0.46 times). It indicates that the management efficiency has decreased during the period of the study and the company has not been able to increase the sale with increase in the assets.

Table 6.4: Management Efficiency Ratios of SAIL from 2005-06 to 2014-15

Years	**Working capital Turnover Ratios (WTR)** ***(In times)***	**Total Assets Turnover Ratio (TATR)** ***(In times)***	**Inventory Turnover Ratio (ITR) (In times)**	**Account Receivable Turnover Ratio (ARTR)** ***(In times)***	**Operating Expense Ratio (OER)** ***(In Percent)***
2005-06	6.97	1.00	5.48	15.29	78.64
2006-07	3.94	0.85	5.50	16.87	72.88
2007-08	3.17	0.76	6.12	15.48	72.69
2008-09	2.94	0.82	5.31	14.93	81.06
2009-10	2.16	0.62	4.46	12.94	72.49
2010-11	2.57	0.57	4.34	11.64	78.68
2011-12	4.40	0.61	3.88	10.81	82.44
2012-13	6.32	0.53	3.11	9.79	85.81
2013-14	24.41	0.51	3.03	9.51	89.48
2014-15	-13.17	0.46	2.82	10.78	87.28

Source*: Calculated from Financial Reports of SAIL*

Note: *WTR = Working Capital Turnover Ratio, TATR = Total Assets turnover Ratio, ITR = Inventory turnover Ratio, ARTR = Account Receivable Turnover Ratio, OER = Operating Expense Ratio.*

The inventory turnover ratio of SAIL was 5.48 times in the year 2005-06 which rose to 6.12 times in the year 2007-08. However, ITR has been in decreasing trend from 2008-09 (5.38 times) to 2014-15 (2.82 times) indicating that company has not been able to efficiently used the increase in inventory stock over the period of the study.

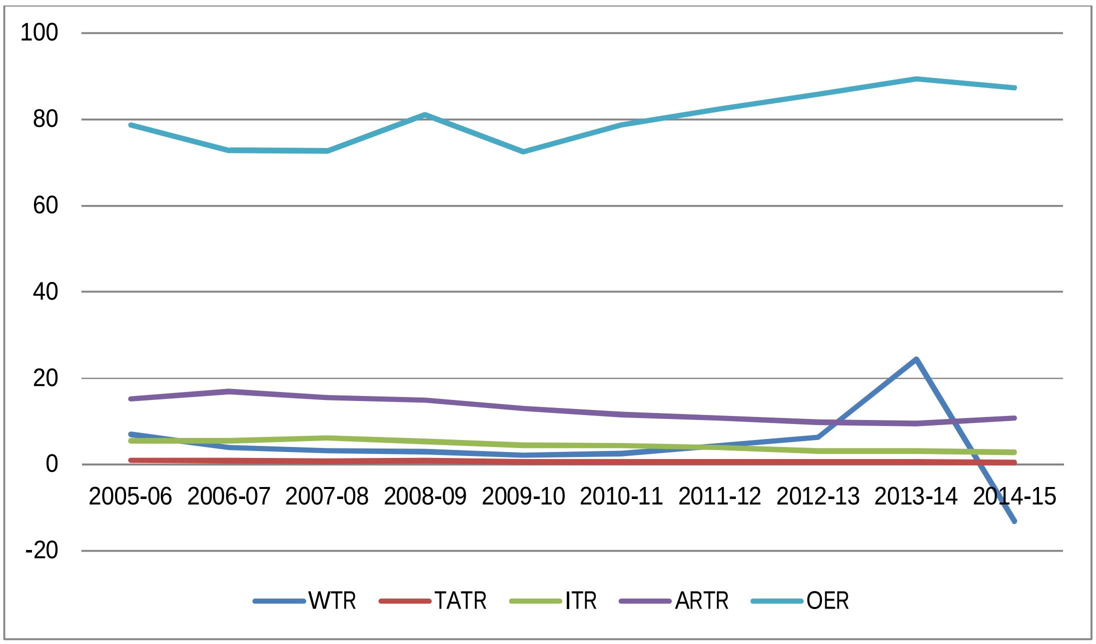
Table 6.4 and figure 6.5 also show the Account receivable turnover ratio of SAIL for ten years from 2005-06 to 2014-15. ARTR indicates the efficiency of credit collection and effective credit policy. The ratio was 15.29 times in the year 2005-06 which rose to become 16.87 times in 2006-07. However, ARTR has been in decreasing trend from 2007-08 (15.48 times) to 2013-14 (9.51 times). The ratio rose to 10.78 times in the final year of the study 2014-15.

The table 6.4 gives details about the operating expense ratios from 2005-06 to 2014-15 indicating the operational efficiency of the management during the study period.

The Operating Ratio of the company has been in a fluctuating trend from the year 2005-06 (78.64 %) to 2009-10 (72.69 %). The operating ratio was 78.64 % in the year 2005-06. In the year 2007-08, it declined to become 72.69 %, indicating increase in operational efficiency of SAIL. However, in the year 2008-09, it again rose to 81.06 %. In the year 2009-10, operating expense ratio again declined to 72.49 % in the year 2009-10. The operating expense ratio of SAIL has been in increasing trend from the year 2010-11 (78.68 %) to 2014-15 (87.28 %) indicating operational efficiency of management of SAIL have decreased during the period of the study.

The above data can be represented with the help of following figure 6.5.

Figure 6.5: Management Efficiency Ratios of SAIL from 2005-06 to 2014-15



***Source**: Calculated from Financial Reports of SAIL*

Note: *WTR = Working Capital Turnover Ratio, TATR = Total Assets Turnover Ratio, ITR = Inventory Turnover Ratio, ARTR = Account Receivable Turnover Ratio, OER = Operating Expense Ratio.*

6.1.5 Market Valuation Ratios Analysis

Table 6.5 and figure 6.6 show market valuation ratios of SAIL. It can be seen that Earnings per share has been in increasing trends during initial years from 2005-06 (Rs. 9.87) to 2007-08 (Rs. 18.39) but the ratio has been in decreasing trend from the year 2009-10 (Rs. 16.59) to the year 2014-15 (Rs. 5.22) except the year 2013-14 (Rs. 6.42). Therefore, EPS of the Company has been higher in the initial years of the study but lower in subsequent years. It is an indication of low return per share of the company. A lower ratio is the indication of the lower capacity of the concern to pay dividend to its equity share holders.

Table 6.5 and figure 6.6 also show the Dividend payout ratio of SAIL for ten years from 2005-06 to 2014-15. DPR has been in decreasing trend during initial years of the study. It was 21 % in 2005-06 which declined to 17 % in 2008-09. However, the ratio has been in increasing trend from the year 2009-10 (20 %) to 2014-15 (39 %) except the year 2013-14 (32 %). DPR indicates the share of company's pay out percentage and the remaining is known as retention ratio of the company. In the final year of the study 2014-15, the payout ratio was maximum (39 %) and in 2008-09 the payout ratio was minimum (17 %), during the period of the study.

Table 6.5: Market Valuation Ratios of SAIL from 2005-06 to 2014-15

Year	Earnings Per Share (EPS) *(In Rs.)*	Dividend Payout Ratio (DPR) *(In Per cent)*	Price Earnings Ratio (PER) *(In times)*	Market to Book value Ratio (MBR) *(In times)*
2005-06	9.87	21	8.44	3.63
2006-07	15.16	21	7.53	3.71
2007-08	18.39	20	10.05	4.37
2008-09	15.12	17	6.38	1.71
2009-10	16.59	20	15.18	3.66
2010-11	12.14	20	13.98	2.08
2011-12	8.7	23	10.81	1.03
2012-13	5.64	38	11.05	0.64
2013-14	6.42	32	11.12	0.71
2014-15	5.22	39	12.91	0.64

Source: *Calculated from Financial Reports of SAIL*

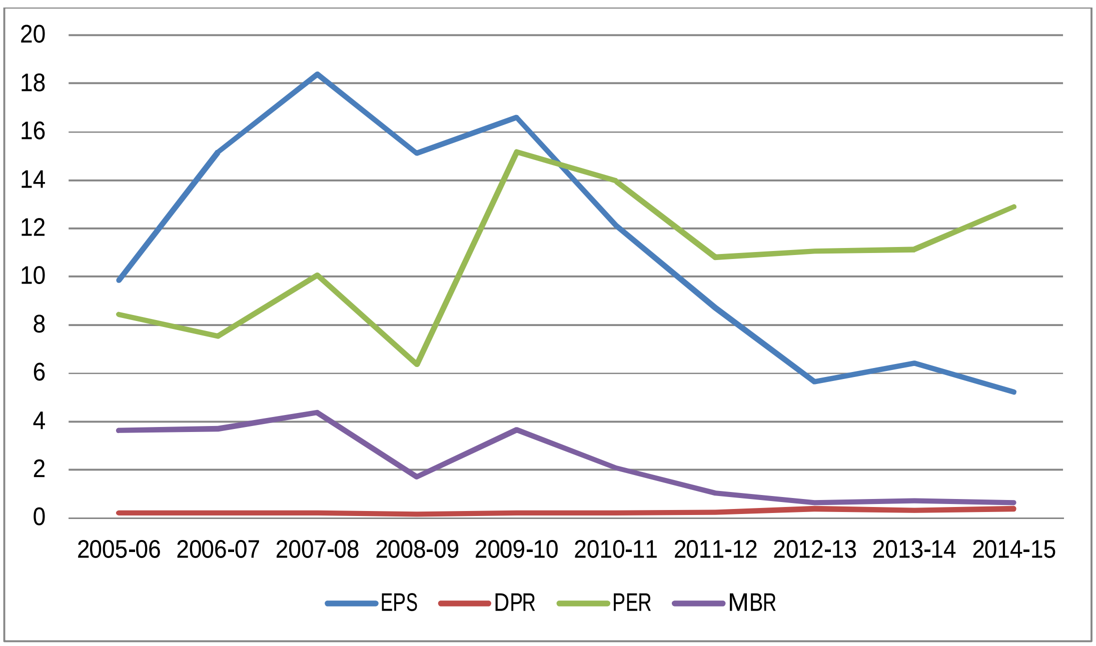
Note: *EPS = Earnings Per Share, DPR = Dividend payout Ratio, PER = Price Earnings Ratio, Market to Book value Ratio.*

Table 6.5 and figure 6.6 also show the Price-Earnings ratio of SAIL for ten years from 2005-06 to 2014-15. PER was 8.44 times in 2005-06 which rose to 10.05 times in 2007-08. However, PER declined to 6.38 times in the year 2008-09. The ratio was maximum in the year 2009-10 (15.18 times) showing strong market position of SAIL in 2009-10. However, PER has been in decreasing trend from 2010-11 (13.98 times) to 2013-14 (11.12 times) indicating negative future expectations of investors during this period. However, the ratio rose to 12.91 times in final year of the study, 2014-15.

As can be seen from the table 6.5, the Market Value to Book value Ratio was higher during the initial years of the study indicating that the investors were ready to pay more than book value per share. The ratio was 1.03 times in the year 2011-12 indicating that the investors were willing to pay almost the same amount as equity per share. However, the figure of MBR has been less than one from the year 2012-13 (0.64 times) to 2014-15 (0.64 times) indicating that investors was willing to pay less than book value per share.

The above data can be represented with the help of following figure 6.6.

Figure 6.6: Market Valuation Ratios of SAILfrom 2005-06 to 2014-15



***Source**: Calculated from Financial Reports of SAIL*

Note: *EPS = Earning Per Share, DPR = Dividend payout Ratio, PER = Price Earning Ratio, Market to Book value Ratio.*

6.2 COMPARISON OF FINANCIAL RATIOS OF STEEL AUTHORITY OF INDIA LIMITED WITH INDUSTRY AVERAGE FINANCIAL RATIOS

6.2.1 Profitability Ratio

In order to see how SAIL has been profitable in comparison to the industry average profitability, the study has used three profitability ratios namely, Return on Assets (ROA), Return on Equity (ROE) and Return on Capital Employed (ROCE).

6.2.1.1 Return on Assets (ROA)

ROA is defined as the ratio of profit after tax to total asset. It reflects the efficiency with which company deploy their assets. The higher the ROA, the most profitable is the company.

The result indicates several important points of comparison of ROA between SAIL and industry average. As it can been seen (Table 6.6, Figure 6.7), ROA of SAIL has been greater than industry average during all years of the study by 1.84% in 2005-06, 3.85% in 2006-07, 2.55% 2007-08, 4.09% in 2008-09, 3.36% in 2009-10, 0.9% in 2010-11, 0.16% in 2011-12, 0.65% in 2012-13 and 0.75% in 2013-14. ROA of SAIL rose to 17.41% in the year 2006-07 from 13.93% in 2005-06 but drastically fell thereafter to 2.82 % in 2012-13, however it again rose to 2.94% in 2013-14. ROA of SAIL has been in decreasing trend over the years under study.

On the other hand, industry average ROA has shown the same trend. It rose to 13.56% in 2006-07 from 12.09% in 2005-06 and then decreased considerably during 2007-08 (12.98%) to 2012-13 (2.17%). However, Industry average ROA recovered to became 2.19% in the year 2013-14. Average, ROA of SAIL (9.56%) has been greater than industry average ROA (7.54 %), during the period under the study.

Table 6.6: Return on Assets of SAIL and Its industry average

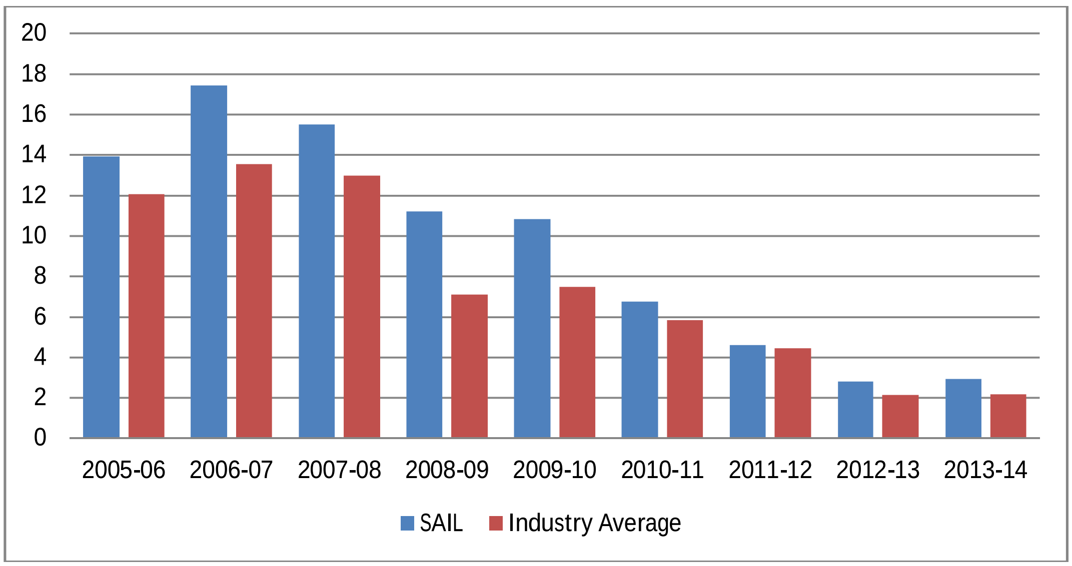
(In Per cent)

Year	SAIL	Industry Average
2005-06	13.93	12.09
2006-07	17.41	13.56
2007-08	15.53	12.98
2008-09	11.21	7.12
2009-10	10.84	7.48
2010-11	6.75	5.85
2011-12	4.59	4.43
2012-13	2.82	2.17
2013-14	2.94	2.19
Mean	**9.56**	**7.54**

Source: *Various Financial Reports of SAIL & Ace Equity Database*

The above data can be presented with the help of following figure 6.7.

Figure 6.7: Return on Assets of SAIL and its Industry Average



Source: *Various Financial Reports of SAIL & Ace Equity Database*

6.2.1.2 Return on Equity (ROE)

This ratio indicates how Company can generate profit with the money that shareholders have invested. The higher value of this ratio shows higher financial performance. Like ROA, this ratio is an indicator for managerial efficiency. Similar to ROA, from the study of ROE of both SAIL and industry average, the researcher underpin some important points to consider.

Table 6.7: Return on Equity of SAIL and Its industry average

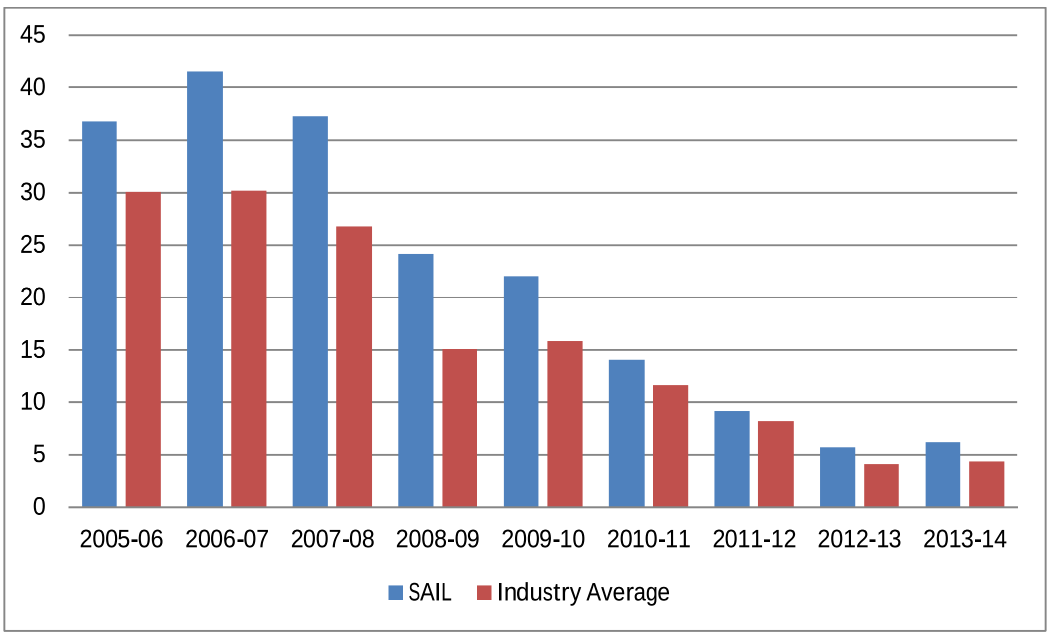
(In Per cent)

Year	SAIL	Industry Average
2005-06	36.77	30.03
2006-07	41.50	30.19
2007-08	37.27	26.79
2008-09	24.15	15.13
2009-10	22.03	15.87
2010-11	14.06	11.6
2011-12	9.23	8.22
2012-13	5.69	4.09
2013-14	6.25	4.39
Mean	**21.88**	**16.26**

Source: *Various Financial Reports of SAIL & Ace Equity Database*

The above data can be presented with the help of following figure 6.8.

Figure 6.8: Return on Equity of SAIL and its Industry Average



Source: *Various Financial Reports of SAIL & Ace Equity Database*

The result shows (see table 6.7 and figure 6.8) that ROE of SAIL has been greater than industry average over the years under the study. During the initial years of the study, the difference was higher which decreased considerably during the later years. ROE of SAIL increased from 36.77% in 2005-06 to 41.50% in 2006-07 whereas, ROE of industry average increased from 30.03% in 2005-06 to 30.19% in 2006-07.

ROE of SAIL has been better than the industry average ROE during the period of the study. Average ROE of SAIL has been 21.88%, greater than mean ROE of industry average for the same periods (16.26%).

6.2.1.3 Return on Capital Employed ROCE)

This ratio indicates how Company can generate profit with the capital employed in the business. The higher value of this ratio shows higher financial performance. Like ROA and ROE, this ratio is also an indicator for managerial efficiency. Similar to ROA and ROE, from the study of ROCE of both SAIL and industry average under the study, the researcher underpin some important points to consider. The result shows (see table 6.8 and figure 6.9) that ROCE of SAIL has been greater than industry average for the years 2005-06, 2006-07 and 2007-08 under the study. For rest of the years, industry average ROCE was greater than that of SAIL. ROCE of SAIL increased from 34.51% in 2005-06 to 41.48% in 2006-07, whereas, industry average ROCE increased from 22.15% in 2005-06 to 24.70% in 2006-07. Industry Average ROCE has been better than the ROCE of SAIL during the period of the study. Average ROCE of the SAIL has been 21.86%, lesser than the mean industry average ROCE for the same periods (i.e. 22.60%).

Table 6.8: Return on Capital Employed of SAIL and its industry average

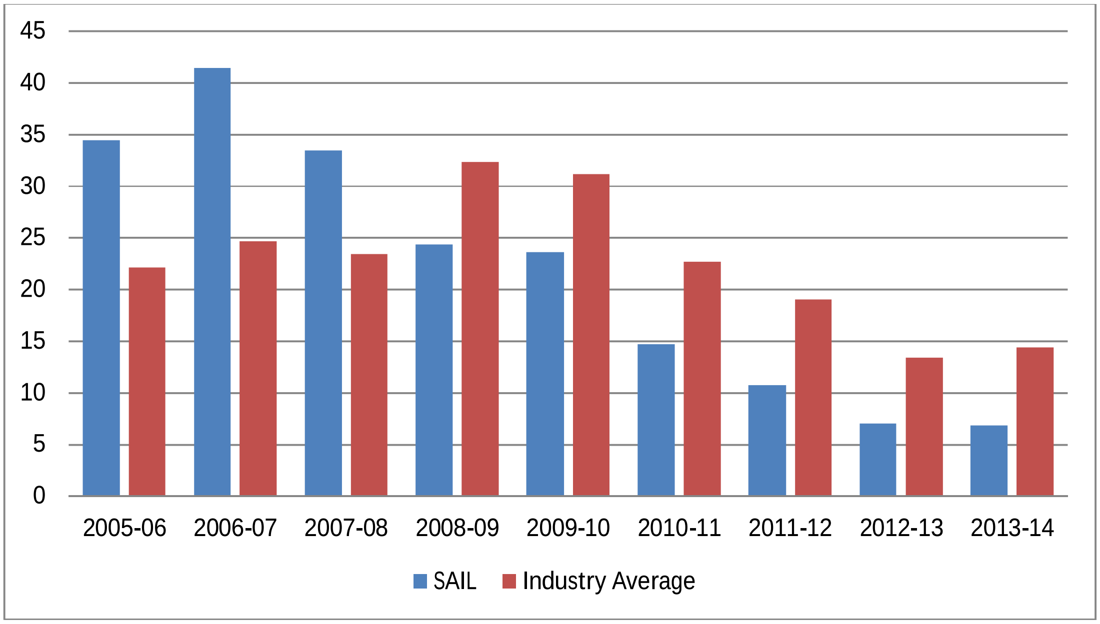
(In Per cent)

Year	SAIL	Industry Average
2005-06	34.51	22.15
2006-07	41.48	24.7
2007-08	33.49	23.44
2008-09	24.34	32.34
2009-10	23.61	31.14
2010-11	14.72	22.73
2011-12	10.73	19.05
2012-13	7.02	13.42
2013-14	6.84	14.41
Mean	**21.86**	**22.60**

Source: *Various Financial Reports of SAIL & Ace Equity Database*

The above data can be presented with the help of following figure 6.9.

Figure 6.9: Return on Capital employed of SAIL and its Industry Average



Source: *Various Financial Reports of SAIL & Ace Equity Database*

6.2.2 Liquidity Ratios

Liquidity ratio measures the capability of a business entity to meet its short-term obligations. Generally, the higher value of this ratio indicates that firm has larger margin safety to cover its short-term obligations. Among the various liquidity measures, the study uses the following two liquidity ratios namely, Current Ratio (CR) and Liquid Ratio (LR) to compare with industry average Ratios.

6.2.2.1 Current Ratio

The current ratio shows the proportion of current assets to current liabilities. The current ratio is used as an indicator of a company's liquidity. Low Current ratio of SAIL compared with industry average during 2005-2008 indicates that SAIL has been comparatively less liquid (table 6.9 and figure 6.10) in the initial years of the study. CR of SAIL decreased from 2.26 times in 2009-10 to 0.95 times in 2013-14. This overall declining trend in CR of SAIL indicates the tendency of comparatively more increase in Current liabilities than increase in Assets and declining liquidity position of SAIL. However, compared to industry average, CR of SAIL has been reasonably higher during 2009-2012, indicating SAIL was in better liquidity position than industry average during 2009-2012. The Mean CR of SAIL 1.66 times have been lower than Mean CR of industry average (1.88 times). Hence, considering the last nine years trend in CR, SAIL has been lesser liquid as compared to industry average.

Table 6.9: Comparison of Current Ratio of SAIL with industry average

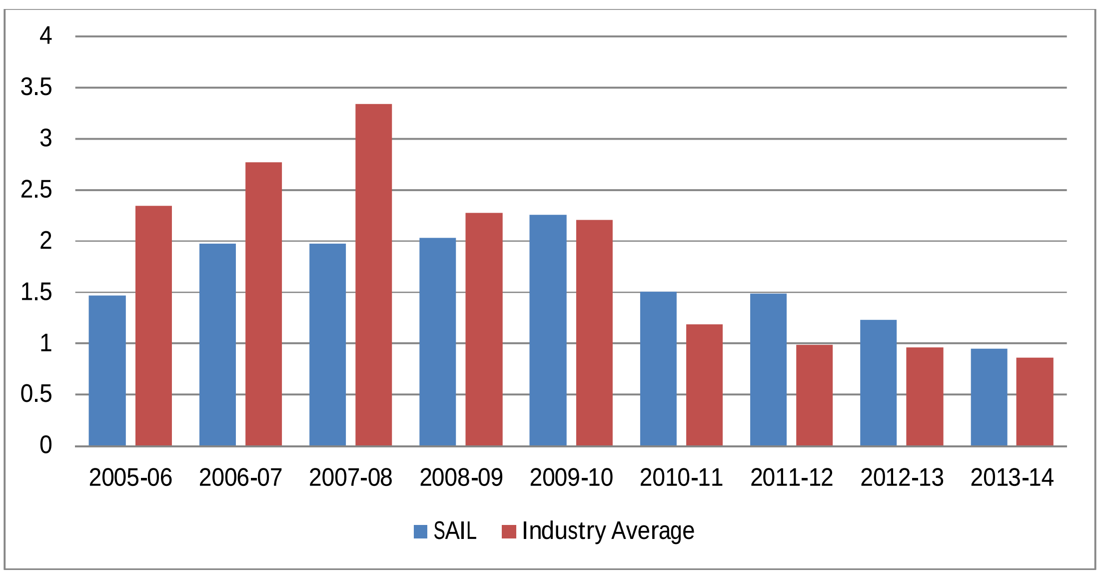
(In times)

Year	SAIL	Industry Average
2005-06	1.47	2.35
2006-07	1.98	2.77
2007-08	1.98	3.34
2008-09	2.03	2.28
2009-10	2.26	2.21
2010-11	1.51	1.19
2011-12	1.49	0.99
2012-13	1.23	0.96
2013-14	0.95	0.86
Mean	**1.66**	**1.88**

Source: *Various Financial Reports of SAIL & Ace Equity Database*

The above data can be represented with the help of following figure 6.10.

Figure 6.10: Current Ratio of SAIL and its Industry Average from 2005-06 to 2013-14



Source: *Various Financial Reports of SAIL & Ace Equity Database*

6.2.2.2 Liquid Ratio

The Liquid ratio or quick ratio is also known as the acid test ratio. The LR compares the total amount of cash, marketable securities and accounts receivable to the amount of current liabilities. Low LR of SAIL compared to industry average during 2005-2008 indicates that SAIL has been comparatively less liquid (see table 6.10 and figure 6.11) during the initial years of the study. LR of SAIL decreased from 1.75 times in 2009-10 to 0.42 times in 2013-14. This overall declining trend in LR of SAIL indicates the tendency of comparatively more increase in Current liabilities than increase in Quick Assets during study period and declining liquidity position of SAIL. However, compared to industry average, LR of SAIL has been reasonably higher during 2009-2011, indicating SAIL has been in better liquidity position than industry average during this period. The Mean LR of SAIL (1.09 times) has been lower than Mean LR of industry average (1.26 times) during study period. Hence, considering the last nine years trend in LR, SAIL has been lesser liquid as compared to industry average.

Table 6.10: Liquid Ratio of SAIL and its industry average from 2005-06 to 2013-14

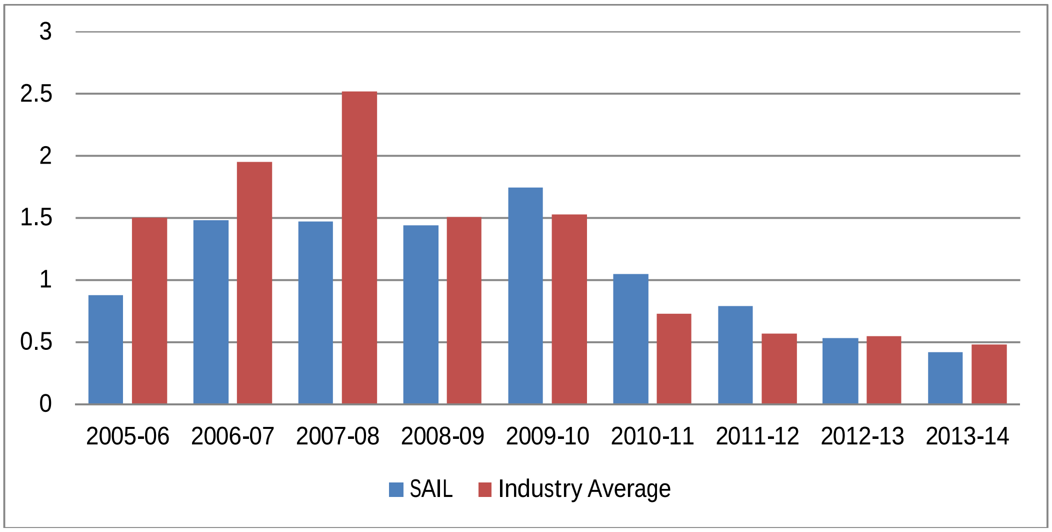
(In times)

Year	**SAIL**	**Industry Average**
2005-06	0.88	1.5
2006-07	1.48	1.95
2007-08	1.47	2.52
2008-09	1.44	1.51
2009-10	1.75	1.53
2010-11	1.05	0.73
2011-12	0.79	0.57
2012-13	0.53	0.55
2013-14	0.42	0.48
Mean	**1.09**	**1.26**

Source: *Various Financial Reports of SAIL & Ace Equity Database*

The above data can be represented with the help of following figure 6.11.

Figure 6.11: Comparison of Liquid Ratio of SAIL with Industry Average



Source: *Various Financial Reports of SAIL & Ace Equity Database*

6.2.3 Management Efficiency Ratios

These ratios measure how effectively and efficiently the firm is managing and controlling its assets. A firm is technically efficient if it produces a given set of outputs using the smallest possible amount of inputs. Efficiency Ratios used to measure efficiency of the SAIL are Total Assets Turnover Ratio (TATR) and Working Capital Turnover Ratio (WTR).

6.2.3.1 Total Assets Turnover Ratio

This ratio shows how efficiently a company can use its assets to generate sales. TATR of SAIL has been in decreasing trend during the period of study from 2005-06 (1.00 times) to 2013-14 (0.51 times), except in the year 2011-12 (0.61 times), indicating declining efficiency of SAIL. TATR of SAIL has been lower than the industry average during study period. Hence, SAIL has been comparatively less efficient in the utilization of assets in generating sales compared to the industry.

Table 6.11: Total Assets Turnover Ratio of SAIL and its industry average from 2005-06 to 2013-14

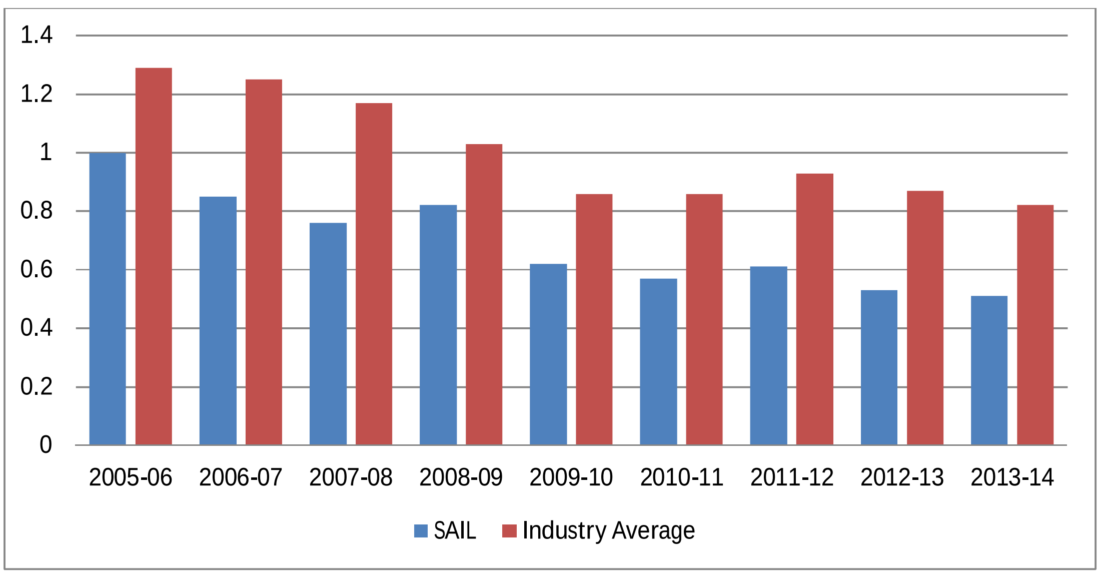
(In times)

Year	SAIL	Industry Average
2005-06	1.00	1.29
2006-07	0.85	1.25
2007-08	0.76	1.17
2008-09	0.82	1.03
2009-10	0.62	0.86
2010-11	0.57	0.86
2011-12	0.61	0.93
2012-13	0.53	0.87
2013-14	0.51	0.82
Mean	**0.70**	**1.01**

Source: *Various Financial Reports of SAIL & Ace Equity Database*

The above data can be represented with the help of following figure 6.12.

Figure 6.12: Total Asset Turnover Ratio of SAIL and its Industry Average



Source: *Various Financial Reports of SAIL & Ace Equity Database*

6.2.3.2 Working Capital Turnover Ratio

The working capital turnover ratio is calculated as net annual sales divided by the average amount of working capital during the same period. It indicates a company's effectiveness in using its working capital. WTR of SAIL has been higher than industry average during 2005-2007 indicating SAIL has utilized its working capital efficiently (see table 6.12 and figure 6.13). During 2008-09 and 2009-10, SAIL has been less efficient in using its working capital compared to industry. Very high and Negative Industry Average WTR indicates very low or negative working capital during this period which shows the condition of financial distress. Hence, it can be concluded that SAIL has been efficient compared to industry Average during study period.

Table 6.12: Working Capital Turnover Ratio of SAIL and its industry average from 2004-05 to 2013-14

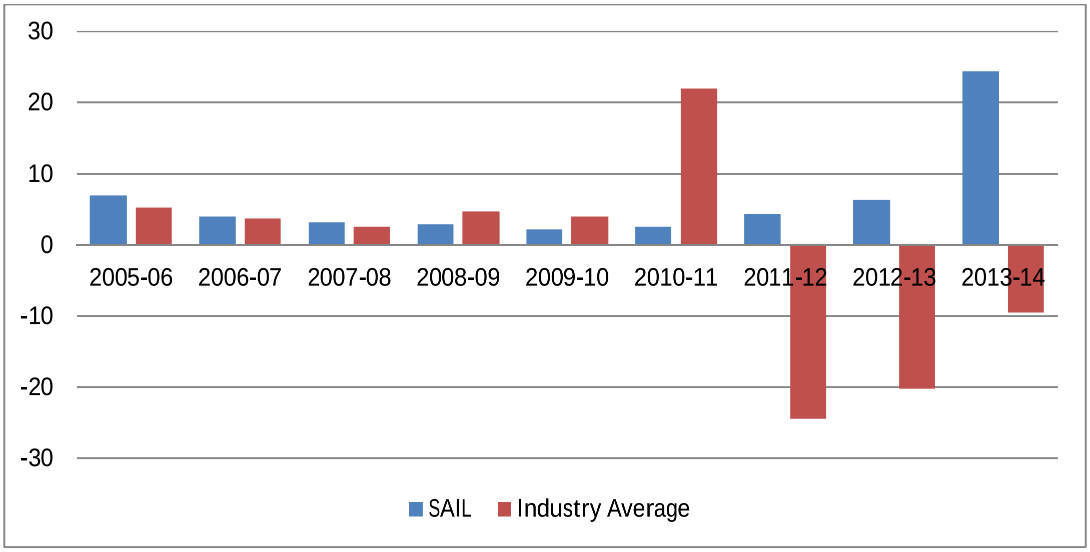
(In times)

Year	SAIL	Industry Average
2005-06	6.97	5.22
2006-07	3.94	3.71
2007-08	3.17	2.59
2008-09	2.94	4.69
2009-10	2.16	3.98
2010-11	2.57	22.02
2011-12	4.40	-24.43
2012-13	6.32	-20.24
2013-14	24.41	-9.52
Mean	**6.32**	**-1.33**

Source: *Various Financial Reports of SAIL & Ace Equity Database*

The above data can be represented with the help of following figure 6.13.

Figure 6.13: Working Capital Turnover Ratio of SAIL and its Industry Average



Source: *Various Financial Reports of SAIL & Ace Equity Database*

6.2.4 Solvency Ratios

The solvency ratios measure the extent to which a firm relies on debt financing rather than equity financing. These ratios are also referred to as gearing, debt, or financial leverage ratios. The more the debt a firm has, the higher is the chance that firm will become unable to fulfill its contractual obligations. The following ratios for solvency, have been used for the study.

6.2.4.1 Debt Equity Ratio

This ratio indicates the proportion of assets financed with debt. A high value of ratio provides indication that firm involves in more risky business. Debt to equity ratio of SAIL has been in fluctuating trend during study period.Average DER of SAIL has been higher as compared to the industry average. Higher DER of SAIL indicates that SAIL has been more reliant on debt financing as compared to equity. Noticeably, table 6.13 and figure 6.14 show that DER of SAIL has been Greater than industry average DER during study period. Consequently, findings of profitability and risk & solvency allow to conclude that SAIL has been more profitable as well as more risky than industry.

Table 6.13: Debt to Equity Ratio of SAIL and its industry average from 2005-06 to 2013-14

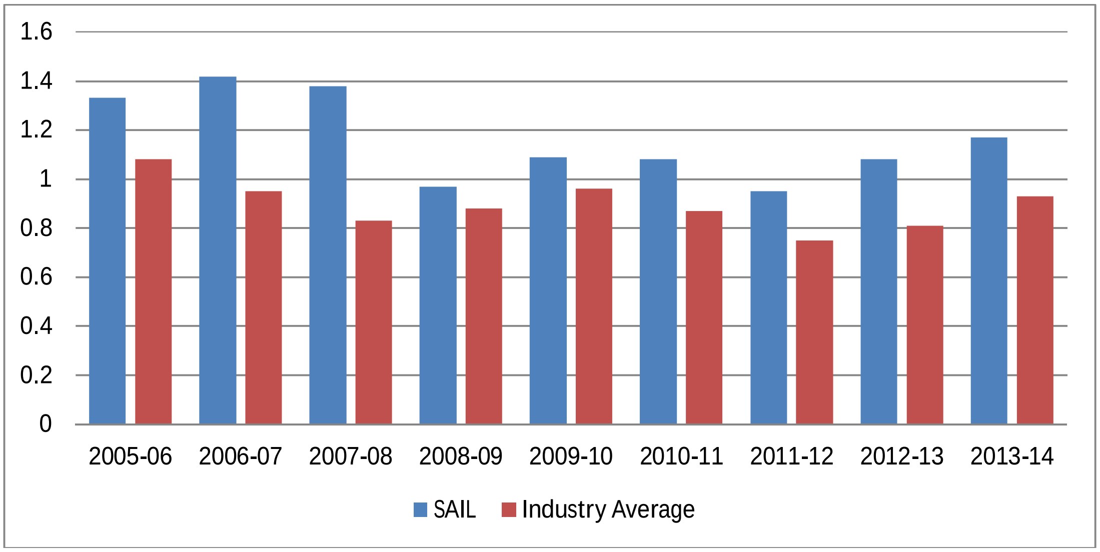
(In times)

Year	SAIL	Industry Average
2005-06	1.33	1.08
2006-07	1.42	0.95
2007-08	1.38	0.83
2008-09	0.97	0.88
2009-10	1.09	0.96
2010-11	1.08	0.87
2011-12	0.95	0.75
2012-13	1.08	0.81
2013-14	1.17	0.93
Mean	**1.16**	**0.89**

Source: *Various Financial Reports of SAIL & Ace Equity Database*

The above data can be presented with the help of following figure 6.14.

Figure 6.14: Debt to Equity Ratio of SAIL and its Industry Average



Source: *Various Financial Reports of SAIL & Ace Equity Database*

6.2.4.2 Interest Coverage Ratio

The interest coverage ratio (ICR) is a measure of company's ability to meet its interest payments. Interest coverage ratio is calculated as earnings before interest and taxes (EBIT) for a time period, often one year, divided by interest expenses for the same time period. The table 6.14 and figure 6.15 depicts that ICR of SAIL rose from 12.94 times in 2005-06 to 45.68 times in 2007-08. However, it has been in decreasing trend from 2008-09 (37.15 times) to 2013-14 (4.20 times). Industry average ICR also showed a decreasing trend from 2006-07 (6.19 times) to 2013-14 (1.68 times). ICR of SAIL has been higher than industry average during the study period. Mean ICR of SAIL (19.77 times) has been much higher than mean industry average ICR (3.79 times) indicating better financial health of SAIL. The company has been more capable of meeting its interest obligations from operating earnings.

Table 6.14: Interest Coverage Ratio of SAIL and its industry average

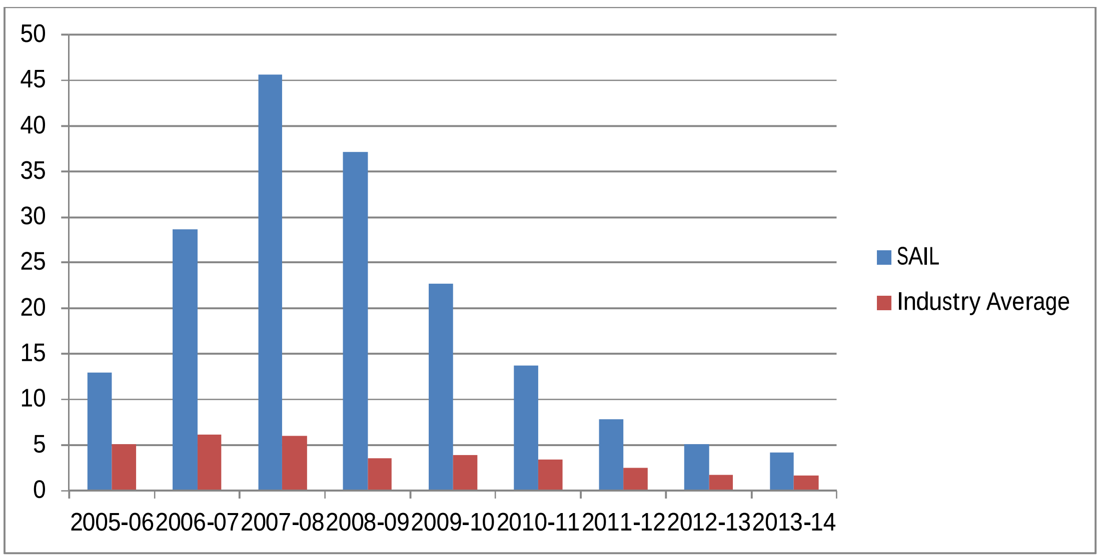
(In times)

Year	SAIL	Industry Average
2005-06	12.94	5.14
2006-07	28.64	6.19
2007-08	45.68	5.95
2008-09	37.15	3.56
2009-10	22.73	3.88
2010-11	13.68	3.43
2011-12	7.79	2.5
2012-13	5.09	1.76
2013-14	4.20	1.68
Mean	**19.77**	**3.79**

Source: *Various Financial Reports of SAIL & Ace Equity Database*

The above data can be represented with the help of following figure 6.15.

Figure 6.15: Interest Coverage Ratio of SAIL and its Industry Average



Source: *Various Financial Reports of SAIL & Ace Equity Database*

6.3 ECONOMIC VALUE ADDED ANALYSIS

This section of the study deals with the analysis of Economic Value Added (EVA) of Steel Authority of India Limited. Economic value added is the financial measure developed by Stern Stewart & Company that emphasizes on the economic profits and value being created or eroded by a company. Many studies have supported EVA as a better measure for firm performance & as better measure for change in shareholder value (Milunovich and Tsuei, 1996; Uyemura et al., 1996; O'Byrne, 1996;

Worthington and West, 2001). However, many studies have also supported traditional performance measures over EVA (Biddle et al., 1998; Chen and Dodd, 2001; Kim, 2006; Maditinos et al., 2009).The concept of EVA is measured as,

EVA = Net Operating Profit after Taxes (NOPAT) – Capital charge

EVA = NOPAT – Weighted average Cost of Capital (WACC) * Economic Capital (CE)

Thus, for the purpose of the study, NOPAT and Economic Capital have been calculated as,

NOPAT = Earnings Before Interest &Tax * (1-Effective Tax Rate)

Economic Capital = Total Assets – Non Interest Bearing Current Liabilities (NIBCLs)

WACC normally constitutes four components namely cost of equity, cost of preference shares, cost of debt and cost of retained earnings. In this study, retained earnings form part of the equity capital and Company does not have any preference shares. Hence, in this study cost is not calculated for retained earnings and preference shares. In the present study Capital Assets Pricing Model (CAPM) has been used for estimating the cost of equity capital while cost of debt has been calculated by multiplying pre-tax cost of total borrowing with (1- Effective Tax rate). Total borrowings include both long term and short term borrowings. The overall cost of capital weighted has been calculated on the basis of company's capital structure. (Calculation of EVA is given in *appendix 2)*.

The magnitude of EVA generated by Steel Authority of India Limited is shown in table 6.15. A negative value indicates that economic value has been lost during the period while positive value shows addition in the economic value of the company. Steel Authority of India Limited registered positive EVA for five years out of ten years of the study period.

Table 6.15: Economic Value Added of SAIL

(In Rs. Crores)

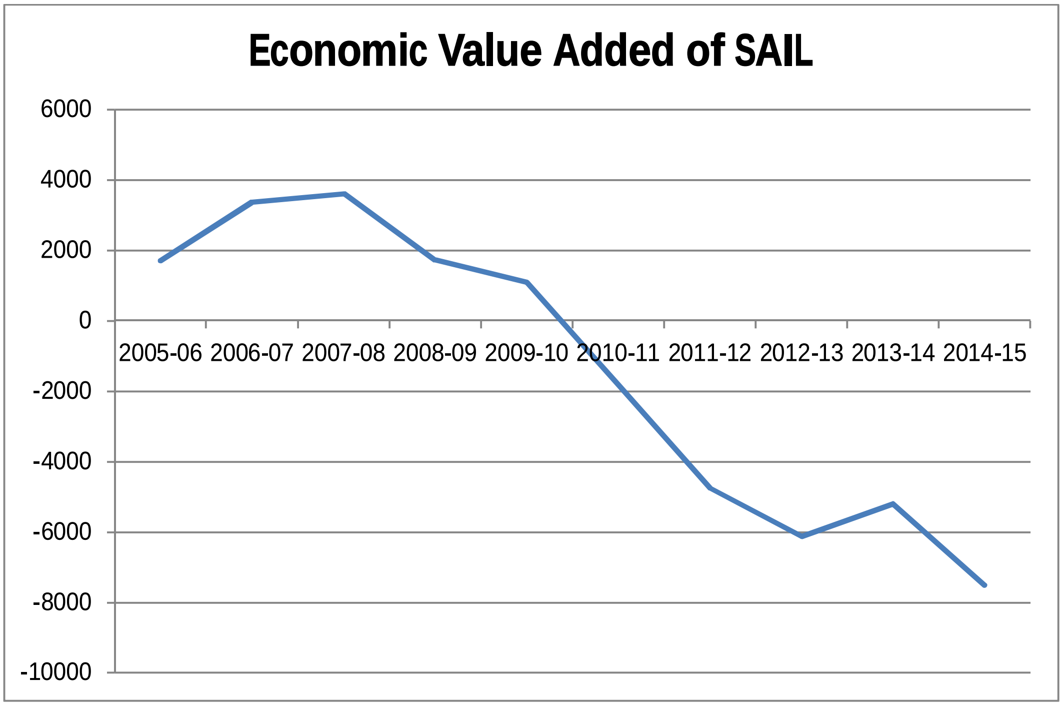
Year	Economic Value Added (EVA)
2005-06	2080.70
2006-07	3206.97
2007-08	3258.16
2008-09	1463.75
2009-10	1053.04
2010-11	-1575.91
2011-12	-4339.63
2012-13	-5647.02
2013-14	-4084.33
2014-15	-5747.90
Mean	**-1033.22**

Source: *Calculated*

Noted: *EVA = Economic Value Added*

The EVA of SAIL shows mixed trend during the study period. In some of the years, SAIL has created value for the shareholders and in some of the years it has destroyed value. EVA of SAIL has been positive during first five years of the study while it has been negative for last five years. The figures of EVA were Rs.2080.70 crores, Rs.3206.97 crores, Rs.3258.16 crores, Rs.1463.75 crores and Rs.1053.04 crores for the years 2005-06, 2006-07, 2007-08, 2008-09 and 2009-10, respectively while the figures of EVA were Rs.(-)1575.91 crores, Rs.(-)4339.63 crores, Rs.(-)5647.02 crores, Rs.(-)4084.33 crores and Rs.(-)5747.90 crores for the years 2010-11, 2011-12, 2012-13, 2013-14, 2014-15, respectively. SAIL created maximum value for its shareholders in the year 2007-08 (Rs. 3258.16 crores) while it destroyed maximum value in the year 2014-15 (Rs.-5747.90 crores) during the study period. Mean EVA during the study period was Rs. (-) 1033.22 crores. The above data on Economic Value Added of SAIL can be presented with the help of following figure 6.16.

Figure 6.16: Economic Value Added of SAIL from 2005-06 to 2014-15



Source: *Calculated*

6.4 MARKET VALUE ADDED ANALYSIS

MVA measures the value added by the management over and above the capital invested in the company by its shareholders and lenders. MVA is obtained by subtracting the economic capital of a corporation from its market value.

However, in the present study it has been assumed that market value of debt is same as its book value. Therefore, with this simplifying assumption, MVA of SAIL has been calculated by subtracting book value of equity from market value of equity. Therefore, Market value of SAIL for the study period as represented by market value of its equity is arrived at by multiplying the stock price by the number of outstanding shares of the firm. Share price of SAIL has been taken at the end of the financial year for the calculation of the market capitalization. Book value of debt is assumed to be equal to the market value of debt *(see appendix 2).*

Table 6.16: Market Value Added of SAIL from 2005-06 to 2014-15

(In Rs. Crores)

Year	Market Value Added (MVA)
2005-06	21698.55
2006-07	29648.85
2007-08	53021.18
2008-09	11392.69
2009-10	70260.01
2010-11	32512.66
2011-12	-1383.03
2012-13	-15857.79
2013-14	-13758.54
2014-15	-16331.02
Mean	**17120.36**

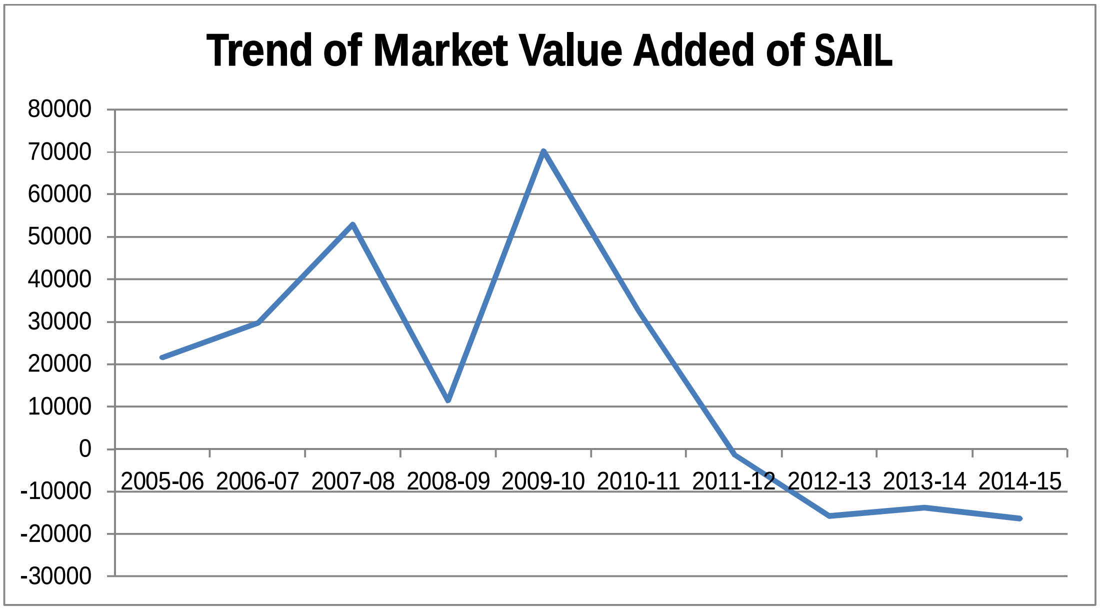
Source: *Calculated*

Noted: *MVA = Market Value Added*

The table 6.16 and figure 6.17 depict the Market Value Added of Steel Authority of India Limited during study period. The Market Value Added of SAIL reveals mixed trend during the study period. In some of the years, SAIL has created Market value for the shareholders while in some of the years it has destroyed it. MVA of SAIL has been positive during first six years of the study while it has been negative for last four years. The figures of MVA were Rs. 21698.55 crores, Rs. 29648.85crores, Rs. 53021.18crores, Rs. 11392.69crores, Rs. 70260.01 crores, and Rs. 32512.66 crores for the years 2005-06, 2006-07, 2007-08, 2008-09, 2009-10 and 2010-11, respectively while the figures of EVA were Rs.(-) 1383.03crores, Rs.(-) 15857.79crores, Rs.(-) 13758.54 crores and Rs.(-) 16331.02 crores for the years 2011-12, 2012-13, 2013-14, 2014-15, respectively. SAIL created maximum Market value for its shareholders in the year 2007-08 (Rs. 70260.01 crores) while it destroyed maximum market value in the year 2014-15 (Rs.(-) 16331.02 crores) during the study period. Mean MVA during the study period was Rs. 17120.36 crores. It is interesting to note here that despite of being destroyer of market value for six years, SAIL has been successful in creation of Market value for its share holder during study period.

The above data can be presented with the help of following figure 6.17.

Figure 6.17: Market Value Added of SAIL from 2005-06 to 2014-15



Source: *Calculated*

6.5 DESCRIPTIVE STATISTICS OF DEPENDENT AND INDEPENDENT VARIABLES IN ORDINARY LEAST SQUARE MODELS

Table 6.17 provides the descriptive statistics of different dependent & independent variables in four OLS models over the period of study from 2005-06 to 2014-15.

Table 6.17: Descriptive Statistics of Dependent and Independent variables in OLS Models

Descriptive Statistics					
	No. of Observations	**Maximum**	**Minimum**	**Mean**	**Std. Deviation**
ROCE	10	0.415	0.061	0.2027	0.130661
ROA	10	0.174	0.022	0.0880	0.056866
CR	10	2.264	0.833	1.5732	0.481445
DER	10	1.419	0.949	1.176	0.171
ITR	10	6.12	4.366	4.450	1.177
MBR	10	2.82	0.640	2.218	1.484
EVA	10	3602.410	-7512.020	-1389.380	4203.876
MVA	10	70260.010	-16331.000	17120.36	29930.990

Sources: *E-Views output*

Note: *ROCE = Return on Capital Employed, ROE = Return on Equity, ROA = Return on Assets, CR = Current Ratio, LR = Liquid Ratio, DER = Debt to Equity Ratio, ICR = Interest Coverage Ratio, TATR = Total Asset Turnover Ratio, WTR = Working Capital Turnover Ratio, EPS = Earnings Per Share, EVA = Economic Value Added, MVA = Market Value Added.*

6.5.1 Return on Capital Employed (ROCE)

The average value of ROCE is 0.2027. This figure indicates an average return of 20.27% on the total capital employed in the business during study period. The figure shows a satisfactory performance of SAIL during study period. However, Standard deviation of ROCE during study period (0.130661) reveals higher level of dispersion indicating that the spread of data is not normal. The minimum figure of ROCE ratio indicates that profitability of SAIL was very low in some years despite the fact that the company has earned decent profits during the study period.

6.5.2 Return on Assets (ROA)

The average value of ROA is 0.0880. This figure indicates an average return of 8.8% on the total Assets employed in the business. The figure shows an average performance during study period. However, Standard deviation of ROA during study period (0.056866) reveals moderate level of dispersion. The minimum figure of ROA ratio (0.022) indicates that profitability of SAIL was very low in some years while maximum figure of ROA ratio (0.174) indicates decent return in some years.

6.5.3 Current Ratio (CR)

The average value of Current ratio as measured by current asset to current liabilities is 1.5732 times. This figure is closer to the ideal standard (2:1). The average figure of CR shows that SAIL has been financially strong enough to honour its short-term debt obligations. However, minimum figure for CR (0.833 times) indicates low current assets while maximum figure for CR (2.264 times) indicates that the company has more current assets, which could has been used to invest instead of raising external short-term debt. The variability in data is normal because the value of standard deviation (0.481445) is quite lower than the mean value (1.5732 times).

6.5.4 Debt to Equity Ratio (DER)

The debt to equity ratio measures the riskiness of a company's financial structure. The ratio reveals the relative proportions of debt and equity financing that a business employs. DER has a mean value of 1.176 times. It means capital structure of SAIL used more than 50% of debt. The standard deviation of DER (0.171) shows that the variability in data is normal because the value of standard deviation is quite lower than the mean value. The maximum and minimum figure for DER of SAIL shows that it ranges between 1.419 times and 0.949 times.

6.5.5 Inventory Turnover Ratio (ITR)

The inventory turnover ratio is an efficiency ratio that shows how effectively the inventory has been managed by the company. The mean ITR of SAIL was 4.45 times during the study period. The standard deviation of ITR (1.177) shows that the variability in data is normal because the value of standard deviation is quite lower than the mean value. The maximum and minimum ITR of SAIL was 6.12 times and 4.366 times, respectively.

6.5.6 Market to Book Value Ratio (MBR)

The price to book ratio is a financial ratio used to compare a company's current market price to its book value. The mean MBR of SAIL was 2.218 times. The standard deviation of MBR (1.484) shows that the variability in data is normal because the value of standard deviation is lower than the mean value. The maximum and minimum MBR of SAIL was 2.82 times and 0.640 times, respectively.

6.5.7 Economic Value Added (EVA)

Economic Value Added (EVA) is an estimate of a firm's economic profit, or the value created in excess of the required return of the company's shareholders. Mean value of EVA (Rs. -1389.380 crores) for SAIL during study period indicates that the company has not been able to create value for its customer or it has been a value destroyer than a value creator for its shareholder during study period. The standard deviation (Rs. 4203.876 crores) indicates high variability of data. Maximum figure for EVA (Rs. 3602.410 crores) shows that company has created value in few years while minimum value for EVA (Rs. -7512.020 crores) indicates value destruction in rest of the years.

6.5.8 Market Value Added (MVA)

Market Value Added measures the value added by the management over and above the capital invested in the company by its shareholders and lenders. Table 6.17 reveals the MVA of SAIL during study period.The mean value of MVA (Rs. 17120.36 crores) indicates that despite of all odd, management has been able to add in the market value of the company. However, Standard deviation (Rs. 29930.990 crores) indicates high variability in the data. Minimum value of MVA (Rs. -16331.000 crores) shows decrease in the market value of SAIL in few years of study while maximum value for MVA (Rs. 70260.010 crores) indicates increase in the market value.

6.6 PRE-TESTING RESULTS

Before conducting the multiple linear regression analysis with the help of ordinary least square method, pre-testing procedure has been conducted to ensure that the required assumptions of Classical linear regression analysis are met to obtain unbiased results.

6.6.1 Normality

This assumption can be checked with the help of various methods, for example skewness and Kurtosis statistics, Shapiro-Wilks test, Kolmogolov-Smirnov test, histogram, normal Q-Q plot, P-P plot, and Box Plot, etc. According to central limit theorem, violation of normality assumption is not important with large sample size as the test statistic will asymptotically pursue the appropriate distribution even in the absence of error normality. But the sample size of present study is small, i.e. 10 observations for each variables. Moreover, Kolmogolov-Smirnov test cannot be considered reliable in case sample size is less the 2000 limit while as Shapiro-Wilks test cannot be considered reliable when sample size exceeds 2000 limit. Therefore, in the present study, the assumption of normality has been checked with the help of P-P plots *(Appendix 3, Fig 3a-3d)*. The figures clearly reflect that the residuals for OLS models under study follow the normal distribution fulfilling an important assumption of linear regression analysis. Although in reality, it is not possible to have perfect normal data. Besides that, the problem of non-normality is a common phenomenon while using financial and economic data.

6.6.2 Correlation Analysis & Multicollinearity results

The pair wise correlation coefficients of different dependent and independent variables have been reported in table 6.18. It can be noticed that bivariate correlation between different independent & dependent variables for four OLS models are highly significant. Table 6.18 also reveals the correlation coefficients between Independent variables for the four OLS models in the study.

Table 6.18: Pearson correlation coefficients between Dependent and independent variables

	ROCE	ROA	CR	ITR	DER	MBR	EVA	MVA
ROCE	1							
ROA	0.994**	1						
CR	0.727*	0.780**	1					
ITR	0.929**	0.952**	0.784**	1				
DER	0.572	0.530	-0.016	0.373	1			
MBR	0.909**	0.923**	0.754*	0.871**	0.560	1		
EVA	0.946**	0.971**	0.857**	0.964**	0.371	0.910**	1	
MVA	0.676*	0.725*	0.843**	0.709*	0.219	0.882**	0.797**	1

Source: *E-Views output*

Note: ******* *Correlation is significant at the 0.01 level (2-tailed).*
***** *Correlation is significant at the 0.05 level (2-tailed).*
ROCE = Return on Capital Employed, ROA = Return on Assets, CR = Current Ratio, ITR = Inventory Turnover Ratio, DER = Debt to Equity Ratio, MBR = Market Value to Book Value Ratio, EVA = Economic Value Added, MVA = Market Value Added

However, here the researcher is concerned with the correlation of independent variables in each model. As multicollinearity problem is needed to be investigated in order to avoid biased regression estimates. It can be noticed from the table 6.18 that Correlation coefficients between independent variables in model 1, 2 & 3 are less than the threshold value (0.8), therefore no serious problem of multicollinearity have been found in model 1, 2 & 3. As it can be seen from table 6.18, the correlation between Current ratio and Debt to equity ratio is low (r = -0.016) and the correlation between inventory turnover ratio and debt to equity ratio (r = 0.373) is not too high to indicate a problem of multicollinearity. However, the correlation coefficient between current Ratio and inventory turnover ratio (r = .78) are large enough to consider but it is lower than the threshold limit of r = 0.8 (Gujrati, et.al. 2012). The correlation coefficients between independent variables in model 4, i.e. between ROCE and EVA, ROCE & MBR and EVA & MBR are 0.946, 0.909, 0.910, respectively, indicating problem of multicollinearity in model 4. Therefore, Variance Inflation Factor (VIF) of the variables has been calculated for further investigation of multicollinearity in the models.

Table 6.19: Variance Inflation Factor

Independent Variables	Variance Inflation Factor (VIF)
CR	3.63
ITR	4.22
DER	1.63

Source: *E-Views output*

Noted: *CR = Current Ratio, ITR = Inventory Turnover Ratio, DER = Debt to Equity Ratio*

Table 6.20: Variance Inflation Factor

Independent Variables	Variance Inflation Factor (VIF)
ROCE	9.87
EVA	9.06
MBR	6.68

Source: *E-Views output*

Noted: *ROCE = Return on Capital Employed, EVA = Economic Value Added, MBR = Market to Book Value Ratio*

The results of variance inflation factor (VIF) have been reported in table 6.19 and table 6.20. It is evident from table 6.19 that VIF ranges from 1.63 to 4.22. These observations confirm that VIF of financial ratios are within the acceptable limit as none of the variables exceeds the threshold limit of 10 (Gujrati, et.al. 2012). This implies that the regression coefficients will be fairly estimating model 1, model 2 & model 3, incorporating financial ratios.

Table 6.20 shows that VIF of ROCE (9.87) and EVA (9.06) are higher but less than the threshold limit of 10. The result indicates that there is no serious problem of multicollinearity in model 4 and the regression coefficients will be fairly estimating model 4.

6.6.3 Autocorrelation

In the Present study the assumption of autocorrelation has been checked with the help of Durbin Watson Test. The values of Durbin-Watson d-statistics, applied on all OLS models have been shown in table 6.21, 6.22, 6.23 & 6.24. The results provide evidence that there exists no serial correlation among errors in the OLS models, since their d- statistic i.e. 2.206, 2.458, 2.396 & 2.253, liebetween 1.5 & 2.5 in all the four OLS models, indicating that there is no serious problem of first order autocorrelation in the data. Thus, null hypothesis of no serial correlation is accepted in these models. However, the Durbin-Watson test analyse linear autocorrelation between direct neighbours only, which are first order effects.

6.6.4 Homoscedasticity

The results of White's General Heteroscedasticity test applied on the time series models are presented in *table 4a-4d, appendix 4*. The results indicate the absence of the heteroscedasticity problem because the corresponding *p*-value of the chi-squares with 3 degrees of freedom in these models is greater than 0.05 (i.e., 5 % level of significance). Therefore, the null hypothesis that the disturbances have equal variances is accepted and the alternative hypothesis that the disturbances have unequal variance stands rejected.

6.7 RESULTS OF DATA ANALYSIS

6.7.1 Multiple Linear Regression Analysis of Profitability and selected Financial Ratios

In this section of the study, influence of selected financial ratios of liquidity, solvency and management efficiency has been examined on Profitability of SAIL using multiple linear regression analysis. The model has been tested by using the OLS technique. T-test was used to test the significance of coefficients of regression of each independent variable and f-test was used to test the significance of regression model. In this section, results of correlation coefficient, regression coefficient, Durbin-Watson test, F-Statistics and t-statistics have been determined between dependent variable (Profitability) and Independent variables (Liquidity, Solvency & Management Efficiency). The values hence obtained have their particular statistical sense. Regression coefficients of each independent variable show the temperament of association between the dependent variable and particular independent variable. The F statistics and t statistics determine the level of significance and insignificance being associated between the variables. Values of R square indicate the extent of variation in the dependent variable explained by independent variables.

Table 6.21: Result of Multiple Linear Regression analysis

Dependent Variable: ROCE

Independent Variables	**Unstandardized Coefficients**	**Std. Error**	**t- statistics**	**Probability**
Constant	-0.524168	0.14108	-5.034864	0.0024
CR	0.078064	0.049738	1.569502	0.1676
DER	0.277888	0.093525	2.971276	0.0249*
ITR	0.068968	0.021917	2.872967	0.0283*
R^2	0.944496			
Adjusted R^2	0.916744			
F - statistic	34.03330			
P – value (F)	0.000366			
Durban-Watson	2.206315			

Source: *E-Views output*

Note: ** significant at 5%, CR = Current Ratio, DER = Debt to Equity Ratio, ITR = Inventory Turnover Ratio*

Table 6.21 summarizes the model performance with relevant analysis. Multiple Linear regression analysis has been done and coefficients of regression have been tested at 5% level of significance. The model coefficient table 6.21 reports the coefficients for Explanatory variables along with the significance value. The results revealed that model is fit as the corresponding probability value of *F*-statistics meets the appropriate statistical criteria at 5% level of significance (i.e. the corresponding *p*-value is less than 0.05). The explanatory power (R^2) of ROCE model is 0.944, which reflects that about 94.4% of change in Return on Capital employed can be explained jointly by the given financial ratios while the remaining 5.6% is attributed to other factors outside the model. The explanatory power (adjusted R^2) that penalizes the addition of extraneous predictors to the model is 91.6%. Table 6.21 discloses coefficient of regression and test statistics for each variable. Coefficients of regression of each explanatory ratio (i.e. CR, DER and ITR) indicate the unique influence on explained Variable (i.e. ROCE).

A low significance value of less than 0.05 for solvency and management efficiency ratios indicates strong relationships between these ratios and Profitability.

Table 6.21 shows that CR is positively influencing ROCE. Coefficient of CR (0.078064) indicates that for every one unit change in CR, there is a 0.078 unit change in ROCE. However, it can be observed that Regression coefficient of CR is statistically insignificant at 5% level of significance (Sig. > 0.05). Therefore, the Null Hypothesis $H0_{1a}$ is accepted.

Table 6.21 depicts that DER is positively influencing ROCE. Coefficient of DER (0.277888) indicates that for every one unit change in DER, there is a 0.28 unit change in ROCE. It can be observed that Regression coefficient of DER is statistically significant at 5% level of significance (Sig. < 0.05). Therefore, the Null Hypothesis $H0_{2a}$ is rejected.

As depicted in table 6.21,Inventory turnover ratio (ITR) has significant positive relationship with Return on Capital Employed at 5% level of significance. Coefficient value of ITR (0.068968) indicates that for one unit change in ITR, there is 0.07 unit change in ROCE. The regression coefficient of ITR is statistically significant at 5% level of significance (Sig. < 0.05). Therefore, the Null Hypothesis $H0_{3a}$ is rejected.

Table 6.22: Result of Multiple Linear Regression analysis

Dependent Variable: ROA

Independent Variables	**Unstandardized Coefficients**	**Std. Error**	**t- statistics**	**Probability**
Constant	-0.223280	0.030195	-7.394700	0.0003
CR	0.041545	0.014426	2.879941	0.0281*
DER	0.109019	0.027125	4.019102	0.0070*
ITR	0.026733	0.006357	4.205463	0.0057*
R^2	0.975351			
Adjusted R^2	0.963027			
F - statistic	79.13959			
P – value (F)	0.000032			
Durban-Watson	2.458487			

Source: *E-Views output*

Note: ***** *significant at 5%, CR = Current Ratio, DER = Debt to Equity Ratio, ITR = Inventory Turnover Ratio*

The above regression table 6.22 summarizes the model performance with relevant analysis. Multiple Linear regression analysis has been done and coefficients of regression have been tested at 5% level of significance. The model coefficient table 6.22 reports the coefficients for Explanatory ratios along with the significance value. The results revealed that model is fit as the corresponding probability value of *F*-statistics meets the appropriate statistical criteria at 5% level of significance (i.e. the corresponding *p*-value is less than 0.05). The explanatory power (R^2) of ROA model is 0.975, which reflects that about 97.5% of change in Return on Assets can be explained jointly by the given financial ratios while the remaining is attributed to other factors outside the model. The explanatory power (adjusted R^2) that penalizes the addition of extraneous predictors to the model is 96.3%. Table 6.22 disclosed coefficient of regression and test statistics for each variable. Coefficients of regression of each explanatory ratio (i.e. CR, DER and ITR) indicate the unique influence on explained Variable (i.e. ROCE).

A low significance value of less than 0.05 for Liquidity, Solvency and management efficiency ratios indicates strong relationships between these ratios and Profitability.

Table 6.22 shows that CR is positively influencing ROA. Coefficient of CR (0.041545) indicates that for every one unit change in CR, There is a 0.0415 unit change in ROA. It can be observed from the above table 6.22, that Regression coefficient of CR is statistically significant at 5% level of significance (Sig. < 0.05). Therefore, the Null Hypothesis $H0_{1b}$ is rejected.

Table 6.22 depicts that DER is positively influencing ROA. Coefficient of DER (0.109019) indicates that for every one unit change in DER, There is a 0.109 unit change in ROA. It can be observed that Regression coefficient of DER is statistically significant at 5% level of significance (Sig. < 0.05). Therefore, the Null Hypothesis $H0_{2b}$ is rejected.

As depicted in table 6.22, the coefficients of Inventory turnover ratio (ITR) have significant & positive relation with Return on Assets at 5% level of significance. Coefficient value of ITR (0.026733) indicates that for one unit change in ITR, there is 0.026 unit change in ROA. The regression coefficient of ITR is statistically significant at 5% level of significance (Sig. < 0.05). Therefore, Null Hypothesis $H0_{3b}$ is rejected.

6.7.2 Multiple Linear Regression Analysis of Economic Value Added (EVA) and selected Financial Ratio

In this section of the study, influence of selected financial ratios of liquidity, solvency and management efficiency has been examined on Economic Value Added of SAIL using linear regression analysis. T test was used to test the significance of regression coefficients and f test was used to test the significance of regression model. In this section, results of correlation coefficient, regression coefficient, Durbin-Watson test, F-Statistics and t-statistics have been determined between dependent variable (Economic Value Added) and Independent variables (Liquidity, Solvency & Management Efficiency). The values hence obtained have their particular statistical sense. Regression co-efficient of independent variables show the temperament of association between the dependent variable and particular independent variable. The F statistics and t statistics determine the level of significance and insignificance being associated between the variables. Value of R square indicates the extent of variation in the dependent variable explained by independent variables.

Table 6.23: Result of Multiple Linear Regression analysis

Dependent Variable: EVA

Independent Variables	**Unstandardized Coefficients**	**Std. Error**	**t- statistics**	**Probability**
Constant	-20540.215	2486.363	-8.261	0.000
CR	3338.861	1187.875	2.810786	0.0307*
DER	3687.906	2233.615	1.651093	0.1498
ITR	2170.859	523.443	4.147272	0.0060*
R^2	0.969417			
Adjusted R^2	0.954126			
F - statistic	63.39583			
P – value (F)	0.000062			
Durban-Watson	2.396630			

Source: *E-Views output*

Note: ***** *significant at 5%, CR = Current Ratio, DER = Debt to Equity Ratio, ITR = Inventory Turnover Ratio*

Table 6.23 summarizes the model performance with relevant analysis. Simple linear regression analysis has been done and coefficients of regression have been tested at 5% level of significance. The model coefficient table 6.23 reports the coefficients for Explanatory ratios along with the significance value. The results reveal that model fit is significant, as the corresponding probability value of *F*-statistics meets the appropriate statistical criteria at 5% level of significance (i.e. the corresponding *p*-value is less than 0.05). Above table disclose coefficient of regression and test statistics for each variable. Coefficients of regression of each explanatory variable (i.e. CR, DER and ITR) indicate the unique influence on explained variable (i.e. EVA). The explanatory power (R^2) of ROCE model is 0.969, which reflects that about 96.9% change in Economic Value Added can be explained jointly by the given financial ratios while the remaining is attributed to other factors outside the model. The explanatory power (adjusted R^2) that penalizes the addition of extraneous predictors to the model is 95.4%.

A low significance value of less than 0.05 for liquidity and management efficiency ratios indicates that there is a strong relationship between these ratios and Profitability.

Table 6.23 depicts that Current Ratio, which has been used as proxy measure of liquidity in the model, is positively influencing EVA. Coefficient of CR (3338.861) indicates that for every one unit change in CR, There is a 3338.861 unit change in EVA. It can be observed that Regression coefficient of CR is statistically significant at 5% level of significance (Sig. < 0.05). Therefore, the Null Hypothesis $H0_{1c}$ is rejected.

As depicted in table 6.23, the coefficients of debt to equity ratio (DER), which has been used as proxy measure of solvency in the model, has insignificant positive relationship with Economic Value Added at 5% level of significance. Coefficient of DER (3687.906) indicates that for every one unit change in DER, There is a 3687.906 unit change in EVA. The regression coefficient of DER is statistically insignificant at 5% level of significance (Sig. > 0.05). Therefore, the Null Hypothesis $H0_{2c}$ is accepted.

Table 6.23 depicts that inventory turnover ratio (ITR), which has been used as proxy measure of management efficiency in the model, is positively influencing EVA. Coefficient of ITR (2170.859) indicates that for every one unit change in ITR, There is a 2170.859 unit change in EVA It can be observed that Regression coefficient of ITR is statistically significant at 5% level of significance (Sig. < 0.05). Therefore, the Null Hypothesis $H0_{3c}$ is rejected.

6.7.3 Multiple Linear Regression Analysis of MVA and selected Financial Variables

In this section, an attempt has been made to find the relevance of Stern and Stewart's claim that MVA of the firm is positively associated with its EVA generating capacity and other financial variables i.e. Profitability and market valuation. Therefore, linear regression analysis has been conducted with MVA as dependent variables and EVA, profitability ratios and market valuation ratios as independent variables.

In this section, results of correlation coefficient, regression coefficient, Durbin-Watson test statistic, F-Statistics and t-statistics have been determined between dependent and Independent variables. The values hence obtained have their particular statistical sense. Regression coefficients of independent variables show the temperament of association between the dependent and particular independent variable. The F statistics and t statistics determine the level of significance and between the variables. Value of R square indicates the extent of variation in the dependent variable explained jointly by independent variables.

Table 6.24: Result of Multiple Linear Regression analysis

Dependent variable: Market Value Added (MVA)

Independent Variables	**Coefficients**	**Std. Error**	**t- statistics**	**Probability**
Constant	29738.07	19258.45	1.544157	0.1735
ROCE	-302251.9	76759.15	-3.937667	0.0076*
EVA	6.249829	2.406295	2.597283	0.0408*
MBR	25849.75	5295.516	4.881441	0.0028*
R^2	0.938078			
Adjusted R^2	0.907118			
F - statistic	30.29895			
P – value (F)	0.000507			
Durban-Watson	2.253649			

Source: *E-views output*

Note: *** significant at 5%, ROCE = Return on Capital Employed, EVA = Economic Value Added, MBR = Market to Book Value Ratio.*

The above regression table 6.24 summarizes the model performance with relevant analysis. Multiple Linear regression analysis has been done and coefficients of regression have been tested at 5% level of significance. The model coefficient table 6.24 reports the coefficients of Explanatory variables along with the significance value. The results revealed that model is fit as the corresponding probability value of *F*-statistics meets the appropriate statistical criteria at 5% level of significance (i.e. the corresponding *p*-value is less than 0.05). The explanatory power (R^2) of MVA model is 0.938, which reflects that about 93.8% of change in Market Value Added can be explained jointly by the given financial ratios while the remaining is attributed to other factors outside the model. The explanatory power (adjusted R^2) that penalizes the addition of extraneous predictors to the model is 90.7%. Table 6.24 discloses coefficient of regression and test statistics for each variable. Coefficients of regression of each explanatory variable (i.e. ROCE, EVA & MBR) indicate the unique influence on explained Variable (i.e. ROCE).

A low significance value of less than 0.05 for Profitability, Economic Value Added and Market valuation indicates that there is a strong relationship between dependent and independent variables.

Table 6.24 depicts that Return on Capital employed (ROCE), which has been used as proxy measure of profitability in the model, is positively influencing MVA. It can be observed that Regression coefficient of ROCE is statistically significant at 5% level of significance (Sig. < 0.05). Therefore the Null Hypothesis $H0_{4a}$ is rejected.

Table 6.24 depicts that Market to Book Value Ratio (MBR), which has been used as proxy measure of Market Valuation in the model, is positively influencing MVA. It can be observed that Regression coefficient of MBR is statistically significant at 5% level of significance (Sig. < 0.05). Therefore, the Null Hypothesis is $H0_{4b}$ is rejected.

Table 6.24 depicts that Economic Value Added (EVA) is positively influencing MVA. It can be observed that Regression coefficient of EVA is statistically significant at 5% level of significance (Sig. < 0.05). Therefore, the Null Hypothesis $H0_{4c}$ is rejected.

6.7.4 Correlation analysis between Economic Value Added and Traditional performance measures

In this section, correlation analysis has been used to test the significance of relationship between Economic Value added and other traditional financial performance measures i.e. ROCE, ROE, ROA and EPS.

Table 6.25: Correlation analysis between EVA and traditional performance measures

Traditional Performance Measure	Pearson coefficient of Correlation with EVA	Significance
ROCE	0.946	.000*
ROE	0.944	.000*
ROA	0.971	.000*
EPS	0.948	.000*

Source: *E-views output*

Note***:*** *** Correlation is significant at 0.01 level, ROCE = Return on Capital Employed, ROE = Return on Equity, ROA = Return on Assets, EPS = Earnings Per Share*

Table 6.25 reveals the relation between modern financial performance measure Economic Value Added with the traditional performance measures (ROCE, ROE, ROA and EPS). Hypotheses have been tested with the help of significance of Pearson coefficient of correlation. The correlation between EVA and other traditional performance measures is very high indicating strong relation between EVA and traditional performance measures. The coefficient of correlation between EVA and ROCE is 0.946 which is significant at 1% level of significance. The coefficient of correlation between EVA and ROE is 0.94 significant at 1% level of significance. The coefficient of correlation between EVA and ROA is 0.971 which is significant at 1% level of significance. The coefficient of correlation between EVA and ROCE is 0.946 which is significant at 1% level of significance and the coefficient of correlation between EVA and EPS is 0.948, significant at 1% level of significance.

Table 6.25 shows positive and significant correlation between Economic Value Added (EVA) and Return on Capital Employed (ROCE). The coefficient of correlation between EVA and ROCE is 0.946. It can be observed that coefficient of correlation statistically significant at 5% level of significance (Sig. < 0.05). Therefore, the null hypothesis $H0_{5a}$ is rejected.

Table 6.25 shows positive and significant correlation between Economic Value Added (EVA) and Return on Equity (ROE). The coefficient of correlation between EVA and ROE is 0.94. It can be observed that coefficient of correlation statistically significant at 5% level of significance (Sig. < 0.05). Therefore, the null hypothesis $H0_{5b}$ is rejected.

Table 6.25 depicts very strong and positive correlation between Economic Value Added (EVA) and Return on Assets (ROA). The coefficient of correlation between EVA and ROCE is 0.971. It can be observed that coefficient of correlation is statistically significant at 5% level of significance (Sig. < 0.05). Therefore, the null hypothesis $H0_{5c}$ is rejected.

As depicted in Table 6.25, there is a positive and significant correlation between Economic Value Added (EVA) and Earning per Share (EPS). The coefficient of correlation between EVA and EPS is 0.948. It can be observed that coefficient of correlation is statistically significant at 5% level of significance (Sig. < 0.05). Therefore, the null hypothesis $H0_{5d}$ is rejected.

6.7.5 Comparison of SAIL's financial ratios with Industry average ratios

In this section of the study, financial ratios of SAIL have been compared with industry average financial ratios with the help of one sample t-test. Since the One-Sample t- test procedure compares the mean to a specified value, it is useful to know what the mean value is. In the present study, industry average financial ratios for a period of nine years from 2005-06 to 2013-14, have been used as the test values. The One-Sample T test procedure tests whether the mean of a single variable differs from a specified constant. The mean value and the constant test value have been displayed in the One Sample t-test table 6.26. A low significance value (below 0.05) indicates that there is a significant difference between the test value and the observed mean.

Table 6.26: Result of One sample t test

Ratios	**Mean (SAIL)**	**Industry average (Test value)**	**t value**	**Sig. (t Value)**
ROA	0.08824	0.0754	.714	.493
ROE	0.20186	0.1626	.870	.407
CR	1.57313	1.88	-2.016	.075
LR	1.01	1.26	-1.566	.152
DER	1.17564	0.89	5.271	.001
ICR	18.04983	3.79	3.07	.015
TATR	0.673	1.01	-6.072	.000
WTR	4.371	-1.33	2.00	.077

Source: *E- Views output*

Noted: *ROCE = Return on Capital Employed, ROA = Return on Assets, ROE = Return on Equity, CR = Current Ratio, LR = Liquid Ratio, DER = Debt to Equity Ratio, ICR = Interest Coverage Ratio, TATR = Total Assets Turnover Ratio, WTR = Working Capital Turnover ratio.*

Table 6.26 shows the mean value of ROA. The mean value is 0.08824 which is higher than our test value of 0.0754. The above table 6.26 shows the t value of 0.714 with significance value of 0.493. The higher value of significance (Sig. > 0.05) shows that 0.08824 is not significantly different from 0.0754. Therefore, observed mean of ROA is not significantly different from the test value. Thus the null hypothesis $H0_{6a}$ is accepted.

Table 6.26 shows the mean value of ROE. The mean value is 0.20186 which is higher than our test value of 0.1626. The above table shows the t value of 0.870 with significance value of 0.407. The higher value of significance (Sig. > 0.05) shows that 0.20186 is not significantly different from 0.1626. Therefore, observed mean of ROE is not significantly different from the test value. Thus the null hypothesis $H0_{6b}$ is accepted.

Table 6.26 depicts the mean value of CR. The mean value is 1.57313 which is lower than our test value of 1.88. The above table 6.26 shows the t value of -2.016 with significance value of 0.075. The higher value of significance (Sig. > 0.05) shows that

1.57313 is not significantly different from 1.88. Therefore, observed mean of CR is not significantly different from the test value. Thus the null hypothesis $H0_{7a}$ is accepted.

As depicted in table 6.26 the mean value of LR is 1.01 which is lower than our test value of 1.26. The above table 6.26 shows the t value of -1.566 with significance value of .152. The higher value of significance (Sig. > 0.05) shows that 1.01 is not significantly different from 1.26. Therefore, observed mean of QR is not significantly different from the test value. Thus the null hypothesis $H0_{7b}$ is accepted.

Table 6.26 shows the mean value of DER is 1.17564 which is higher than our test value of 0.89. The above table 6.26 shows the t value of 5.271 with significance value of 0.001. The Lower value of significance (Sig. < 0.05) shows that 1.17564 is significantly different from 0.89. Therefore, observed mean of DER is significantly different from the test value. Thus the null hypothesis $H0_{8a}$ is rejected.

As depicted in table 6.26 the mean value of ICR is 18.04983 which is much higher than our test value of 3.79. The above table 6.26 shows the t value of 3.017 with significance value of 0.015. The lower value of significance (Sig. < 0.05) shows that 18.04983 is significantly different from 3.79. Therefore, observed mean of ICR is significantly different from the test value. Thus the null hypothesis $H0_{8b}$ is rejected.

Table 6.26 depicts the mean value of TATR. The mean value is 0.673 which is lower than our test value of 1.01. The above table 6.26 shows the t value of -6.072 with significance value of 0.000. The lower value of significance (Sig. < 0.05) shows that 0.673 is significantly different from 1.01. Therefore, observed mean of TATR is significantly different from the test value. Thus the null hypothesis $H0_{9a}$ is rejected.

Table 6.26 shows the mean value of WTR. The mean value is 4.371 which is higher than our test value of -1.33. The above table 6.26 shows the t value of 2.000 with significance value of 0.077. The higher value of significance (Sig. > 0.05) shows that 4.371 is not significantly different from -1.33. Therefore, observed mean of WTR is not significantly different from the test value. Thus the null hypothesis $H0_{9b}$ is accepted.

6.8 CHAPTER SUMMARY

In this chapter, investigation of descriptive statistics has been discussed in detail and the results of regression models have been integrated and discussed to arrive at a conclusion. The required assumptions of regression analysis like multicollinearity, normality, heteroscedasticity and autocorrelation have been tested before estimating the regression models. The chapter provides the detail discussion on regression results. The impact of financial ratios on financial performance of SAIL has been assessed by using time series regression analysis. The results revealed significant influence of certain independent variables on financial performance of SAIL. This chapter has also discussed correlation between modern performance measure (EVA) and traditional performance measures (ROCE, ROE, ROA and EPS). In this chapter Industry average financial ratios have been used as benchmark ratio and financial ratios of SAIL have been compared with industry average financial Ratios.

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Chapter 7

Summary of Findings, Conclusion & Suggestions

Chapter – 7

Summary of Findings, Conclusion and Suggestions

7.0 INTRODUCTION

In the present study an attempt has been made to analyze the financial performance of one of the most important public sector company in steel industry i.e. Steel Authority of India Limited for a period of ten years ranging from 2005-06 to 2014-15. In the previous chapter of the thesis, data analysis and hypotheses testing has been done with the help of appropriate tools and techniques. Trend of various financial ratios under profitability, liquidity, solvency, management efficiency and market valuation, has been analyzed, over the period of study. Industry averages for different financial ratios were used as standard ratios and one sample t test was applied to analyze if significant difference exist between financial ratios of SAIL and Industry average for that ratio. In the present study both Traditional as well as Advanced measures of financial performance were used to analyze the financial performance of SAIL. Profitability ratios proxied by Return on Capital employed (ROCE) & Return on Assets (ROA) were used as conventional performance measures while Economic Value Added (EVA) and Market Value added (MVA) were used as advance performance measures. Pearson coefficient of correlation was used to analyze the extent of relationship between traditional measures and advanced measure (EVA) of financial performance. Furthermore, multiple linear regression technique was applied to find the impact of Liquidity, Solvency and Management efficiency on traditional measures of performance (ROCE & ROA) as well as advanced performance measure (EVA). Lastly, multiple linear regression technique was applied to find the impact of profitability, Economic Value Added and market valuation on Market Value Added of SAIL during the study period.

The present chapter gives a summary of findings based on data analysis and hypothesis testing, discusses conclusions drawn on the basis of findings and offers suggestions for the improvement of financial performance of Steel Authority of India Limited.

7.1 FINDINGS OF THE STUDY

7.1.1 Findings on the Basis of trend of financial ratios

1. The gross profit ratio of the SAIL has been in fluctuating trend during study period. The GPR was highest in the year 2007-08 (45.29%) and was lowest in the year 2005-06 (36.37%). The gross profit ratio has been satisfactory during study period.

2. The Operating Profit Ratio was highest in the year 2007-08 (18.53%) and was lowest in the year 2013-14 (4.94%). There was a considerable declined in the operating ratio in the year 2008-09 (10.37%). It indicates decline in the operating efficiency of the company during study period.

3. The Net Profit Ratio of the company decreased considerably during study period. NPR has been in decreasing trend from 2010-11(11.17%) to 2014-15 (4.60%) except in the year 2013-14 (5.55%). It indicates decline in the management's efficiency of the company in operating the business successfully during the study period.

4. Return on assets ratio (ROA) of the company during the study period was maximum (17.41%) in 2006-2007 and it was minimum (2.21%) in 2014-15. Average return on assets during study period was 8.8%. It indicates that the company has not utilized the assets efficiently during the study period.

5. Return on Shareholders' Equity Ratio has been in decreasing trend from the year 2007-08 (37.27%) to the year 2014-15 (4.93%) except in the year 2013-14 (6.25%). It can be noted that the ratio showed a very sharp decline in last years of study. It indicates very low return on shareholders' equity during the study period.

6. Return on Capital employed has been in decreasing trend from 2005-06 (34.51%) to 2014-2015 (6.08%) except the year 2006-2007 (41.48%). The ROCE of the company was much lower (6.08%) in the final year 2014-2015 indicating low return on capital employed in the business.

7. SAIL has shown maintenance of low Current Ratio during the study period except in the years 2006-2007 to 2009-2010. The average current ratio of SAIL during the period of the study was 1.57 times while the standard for current ratio is 2:1. Hence, the liquidity position of the company was not satisfactory during the study period.

8. The liquid ratio has been in decreasing trend during the period of study with highest value (1.75 times) in the year 2009-10 and least value (0.32 times) in 2014-15. Average value of liquid ratio over the period of study has been satisfactory (1.01 times) but the company has to revise its liquidity policy to enhance the liquidity position.

9. Cash Ratio has also shown decreasing trend over the period of study except in the year 2009-10 (1.28 times).

10. Debt to equity ratio of SAIL has been more than 1:1 for all the years during the study period except for two years, 2008-09 (0.97 times) & 2011-12 (0.95 times). The average debt to equity ratio of the company (1.18 times) indicates that the company has been financially leveraged during the study period.

11. The Interest Coverage Ratio of the company was satisfactory during the initial years of the study. However, ICR has been in decreasing trend from the year 2008-09 (37.15 times) to 2014-15 (2.61 times), indicating decreasing earning capacity of SAIL and excessive use of debt during these years.

12. Solvency ratio of SAIL has been in a fluctuating trend during the period of the study. The solvency ratio shows the proportion of assets needs to repay the debts. The lower ratio indicates lower risk and greater safety to the owners.

13. Capital gearing ratio of SAIL has been in a fluctuating trend during the period of the study. The average value CGR (3.38 times) indicates that long term debt of the company were lower than its equity during the period of study.

14. Working capital turnover ratio has been in fluctuating trend during the study period. WTR was exceptionally very high (24.0 times) in 2013-14 and was

negative in 2014-15 (-13.17 times), indicating a very low maintenance of working capital in during last years of the study.

15. Total assets turnover ratio of SAIL was in declining trend from 2005-06 to 2014-15. It indicates decline in the management efficiency during the study period. The company has not been able to increase the sale with increase in the assets.

16. The inventory turnover ratio of SAIL has been in decreasing trend from 2008-09 (5.38 times) to 2014-15 (2.82 times) indicating company has not been able to efficiently used the increase in inventory stock over the period of the study.

17. The Account receivable turnover ratio indicates the efficiency of credit collection and effective credit policy. The ratio has been in decreasing trend from 2007-08 (15.48 times) to 2013-14 (9.51 times). However, the ratio rose to 10.78 times in the final year of the study i.e. 2014-15.

18. The Operating Ratio of the company has been in fluctuating trend from the year 2005-06 (78.64 %) to 2009-10 (72.69%). The operating expense ratio of SAIL has been in decreasing trend from the year 2010-11 (78.68%) to 2014-15 (87.28%) indicating operational expenses have increased during the period of study.

19. Earnings per share has been in increasing trends in the initial years from 2005-06 (Rs. 9.87) to 2007-08 (Rs. 18.39) but the ratio was in decreasing trend from the year 2009 (Rs. 16.59) to the year 2014-15 (Rs. 5.22) except the year 2013-14 (Rs. 6.42). Lower EPS is the indication of the lower capacity of the concern to pay dividend to its equity shareholders.

20. Dividend payout ratio of SAIL has been in decreasing trend during initial years of the study. However, the ratio has been in increasing trend from the year 2009-10 (20%) to 2014-15 (39%) except the year 2013-14 (32%). In the last year of the study 2014-15, the payout ratio was maximum (39%) and in 2008-09 the payout ratio was minimum (17%).

21. The Price-Earnings ratio of SAIL was maximum in the year 2009-10 (15.18 times) showing strong market position of SAIL in 2009-10. However, PER has been in decreasing trend from 2010-11 (13.98 times) to 2013-14 (11.12 times) indicating negative future expectations of investors during this period.

22. The Market Value to Book value Ratio was higher in the initial years of the study indicating that the investors were ready to pay more than equity per share or book value per share. However, the figure of MBR has been less than 1.0 from 2012-13 (0.64 times) to 2014-15 (0.64 times) indicating market willing to pay less than book value per share.

23. Economic Value Added of SAIL has been positive during first five years of the study. It was Rs.2080.70 crores, Rs.3206.97 crores, Rs.3258.16 crores, Rs.1463.75 crores and Rs.1053.04 crores for the years 2005-06, 2006-07, 2007-08, 2008-09 and 2009-10, respectively. EVA was negative for the other five years, it was Rs.(-)1575.91 crores, Rs.(-)4339.63 crores, Rs.(-)5647.02 crores, Rs.(-)4084.33 crores and Rs.(-)5747.90 crores for the years 2010-11, 2011-12, 2012-13, 2013-14, 2014-15, respectively.

24. Market Value Added of Steel Authority of India Limited has been positive during first six years of the study while it has been negative for last four years. The figures of MVA were Rs. 21698.55 crores, Rs. 29648.85crores, Rs. 53021.18crores, Rs. 11392.69crores, Rs. 70260.01 crores, and Rs. 32512.66 crores for the years 2005-06, 2006-07, 2007-08, 2008-09, 2009-10 and 2010-11, respectively while the figures of MVA were Rs.(-) 1383.03crores, Rs.(-) 15857.79crores, Rs.(-) 13758.54 crores and Rs.(-) 16331.02 crores for the years 2011-12, 2012-13, 2013-14, 2014-15, respectively.

7.1.2 Findings on the basis of comparison of financial ratios with the Industry Average ratios & one sample t test

1. Return on Assets of SAIL has been greater than industry average during the study period by 1.84% in 2005-06, 3.85% in 2006-07, 2.55% 2007-08, 4.09% in 2008-09, 3.36% in 2009-10, 0.9% in 2010-11, 0.16% in 2011-12, 0.65% in 2012-13 and 0.75% in 2013-14. Average, ROA of SAIL (9.56%) has been

greater than ROA of industry average (7.54 %) during the period under the study. However, the higher value of significance (Sig. > 0.05) in table 6.26 shows that mean ROA of SAIL is not significantly different from its Industry mean.

2. That Return on Equity of SAIL has been greater than industry average during the years under the study. The difference was higher in initial years of study which decreased considerably during later years. Average ROE of the SAIL (21.88%) was higher than industry average ROA (16.26%). However, the higher value of significance (Sig. > 0.05) in table 6.26 shows that mean ROE of SAIL is not significantly different from Industry mean.

3. Lower Current ratio of SAIL during 2005-2008 indicates that SAIL has been comparatively lesser liquid during these years. However, CR of SAIL has been reasonably higher during 2009-2012, indicating SAIL was in better liquidity position than industry average during these years. The Mean CR of SAIL (1.66 times) has been lower than industry average CR (1.88 times) indicating that SAIL has been lesser liquid as compared to industry average. However, the higher value of significance (Sig. > 0.05) in table 6.26 shows that mean CR of SAIL is not significantly different from Industry mean.

4. Lower LR of SAIL compared to industry average during 2005-2008 indicates that SAIL has been comparatively lesser liquid during these. However, compared to industry average, LR of SAIL has been reasonably higher during 2009-2011. The Mean LR of SAIL (1.09 times) has been lower than that of industry average (1.26 times) indicating that SAIL has been lesser liquid as compared to industry average. However, the higher value of significance (Sig. > 0.05) in table 6.26 shows that mean LR of SAIL is not significantly different from Industry mean.

5. Total assets Turnover Ratio of SAIL has been lower than the industry average during study period. Hence, SAIL has been comparatively lesser efficient in utilization of its assets in generating Sales than industry. The lower value of significance (Sig. > 0.05) in table 6.26 shows that mean TATR of SAIL is significantly different from Industry mean.

6. The working capital turnover ratio of SAIL has been higher than industry average during 2005-2007 indicating SAIL has utilized its working capital more efficiently than industry. During 2008-09 and 2009-10, SAIL has been lesser efficient in using its working capital compared to industry. Very high and Negative WTR indicates very low or negative working capital during this period. The higher value of significance (Sig. > 0.05) in table 6.26 shows that mean WTR of SAIL is not significantly different from Industry mean.

7. Debt to equity ratio of SAIL has been higher than industry average Debt to Equity Ratio during the study period. Average DER of SAIL (1.16 times) has been higher as compared to the industry average DER (0.89 times). The lower value of significance (Sig. > 0.05) in table 6.26 shows that mean DER of SAIL is significantly different from Industry mean.

8. The interest coverage ratio of SAIL has been higher than industry average during the study period. Mean ICR of SAIL (19.77 times) has been much higher than mean industry average ICR (3.79 times) indicating better financial health of SAIL. The lower value of significance (Sig. > 0.05) in table 6.26 shows that mean ICR of SAIL is not significantly different from Industry mean.

7.1.3 Findings on the basis of multiple regressions Analysis

1. It can be seen from table 6.21 that three variables are individually contributing to the variations in return on capital employed when influence of other variables are kept constant. The t statistics and significance (p) values give a rough indication of the impact of each predictor variable namely, Current ratio, Debt to equity Ratio and Inventory turnover ratio, on predicted variable Return on Capital Employed. However, it can be observed that Regression coefficient of CR is statistically insignificant at 5% level of significance (Sig. > 0.05) while Regression coefficients of DER and ITR are statistically significant (Sig. > 0.05). The R square value in terms of these variables is 94.4%. Overall ANOVA results and P value is less than 0.05 ($p < 0.05$). Hence, the model is statistically significant.

2. It can be seen from table 6.22 that three variables are individually contributing significantly to the variations in return on Assets, when influence of other variables is kept constant. The t statistics and significance (p) values give a rough indication of the impact of each predictor variable, namely Current ratio, Debt to equity Ratio and Inventory turnover ratio, on predicted variable Return on Assets. Regression coefficients of CR, DER and ITR are statistically significant (Sig. > 0.05). The R square value in terms of these variables is 96.3%. Overall ANOVA results and P value is less than 0.05 ($p < 0.05$). Hence, the model is statistically significant.

3. It is revealed from table 6.23 that three variables are individually contributing to the variations in the Economic Value Added of SAIL when influence of other variables is kept constant. The t statistics and significance (p) values give a rough indication of the impact of each predictor variable, namely Current ratio, Debt to equity Ratio and Inventory turnover ratio, on Predicted variable EVA. However, it can be observed that Regression coefficient of DER is statistically insignificant at 5% level of significance (Sig. > 0.05) while Regression coefficients of CR and ITR are statistically significant (Sig. < 0.05). The R square value in terms of these variables is 96.9%. Overall ANOVA results and P value is less than 0.05 ($p < 0.05$). Hence, the model is statistically significant.

4. It is found from table 6.24 that three variables are individually contributing significantly to the variations in the Market Value Added of SAIL when influence of other variables are kept constant. The t statistics and significance (p) values give a rough indication of the impact of each predictor variable, namely Return on Capital Employed, Economic Value Added and Market to book Value Ratio on predicted variable. It can be observed that Regression coefficient of ROCE, EVA and MBR are statistically significant (Sig. > 0.05). The R square value in terms of these variables is 93.8%. Overall ANOVA results and P value is less than 0.05 ($p < 0.05$). Hence, this model is statistically significant.

7.1.4 Findings on the basis of Correlation analysis

1. It is evident from table 6.25 that the value of Pearson coefficient of correlation between Economic value added and Return on Capital employed is 0.946, indicating high degree of correlation between EVA and ROCE. The coefficient of correlation between EVA and ROCE is significant at 1% level of significance.

2. It can be seen from table 6.25 that the value of Pearson coefficient of correlation between Economic value added and Return on Equity is 0.946, indicating high degree of correlation between EVA and ROE. The coefficient of correlation between EVA and ROE is significant at 1% level of significance.

3. Table 6.25 depicts the value of Pearson coefficient of correlation between Economic Value Added and Return on Assets as 0.971, indicating high degree of correlation between EVA and ROA. The coefficient of correlation between EVA and ROA is significant at 1% level of significance.

4. As depicted in table 6.25, the value of Pearson coefficient of correlation between Economic value added and Earning Per Share is 0.948, indicating high degree of correlation between EVA and EPS. The coefficient of correlation between EVA and EPS is significant at 1% level of significance.

7.1.5 General findings

1. India has become the world‘s fourth largest producer of crude steel in 2014, preceded only by China, Japan and USA. However, in 2014 India accounted for only 5% of total world crude steel production while China accounted for 49% of total world crude steel production followed by Japan (6.7%) and US (5.3%).

2. In 2014, per capita consumption of steel in India was only 59.4 kg as against the world average of 216.6 kg showing that despite of being fourth largest producers of crude steel in the world, India is lagging behind other major steel producing countries in terms of per capita consumption of steel

3. The private sector of steel industry is currently playing an important role in production and growth of steel industry in India. It can be concluded that the trend percentage of public sector is in declining stage when compared to private sector. Share of public sector has declined from 41% in 2003-04 to 21% in 2013-14.

4. The production of crude steel in India showing a constant rise with the rise in installed capacity of production but capacity utilization has decline from 91% in 2005-06 to 81% in 2013-14.

5. India has been net importer of steel in most of the years during last decade. In 2014-15, India imported 9.3 Mt of steel, an increase of 71% in comparison to 2013-14 while it exported a mere 5.5 Mt steel, a decrease of 6.5% in comparison to 2013-14.

6. Currently, Global Steel Industry is facing challenge of surplus steel production capacity and slow demand growth which have led to decline in steel prices and have impacted steel industries of many countries by oversupply of steel in global market.

7. Currently, Indian steel industry is facing challenge of cheap imports from China, Japan, South Korea & Russia. Because of these cheap imports, price of steel has declined and the domestic steel industry, with higher borrowing and raw material cost and lower productivity, is at a comparative disadvantage.

7.2. CONCLUSION BASED ON FINDINGS OF THE STUDY

The profitability ratios show that overall profitability of SAIL has been positive during study period. However, the profitability of SAIL has declined over the period of study. The gross profit margin of SAIL has been in fluctuating trend because of changes in prices of raw material which leads to fluctuations in cost of goods sold while the operating profit margin is much lower than the gross profit margin indicating increase in operating expenses over the study period. The current ratio and quick ratio of SAIL represents the ability of the company to pay the short-term liabilities. The short term solvency position or liquidity position of SAIL was not good during study period as current ratio and quick ratio were lower than standard norms. Negative working capital in last year of study indicates more current liabilities than current assets. Therefore, it can be concluded that liquidity position of SAIL deteriorated during study period and it may become worst in near future where SAIL may not be able to honour its short term obligations, so liquidity is the area where sincere attention is required. Long term solvency position of SAIL has been satisfactory during study period. The overall debt equity ratio indicates that company has more debt capital than equity capital indicating that SAIL is exploring the trading on equity advantages but because of declining profit and increase in interest charges, interest coverage of SAIL has decline. Although, SAIL is earning enough profit to cover its financial charges but proper attention is required in this area.

From the Findings of the study it is concluded that the management efficiency of SAIL has declined over the study period. Asset turnover ratio of SAIL has declined indicating that SAIL has not been able to utilize the resources effectively. Asset turnover of SAIL has been lower than industry average. Decline in inventory turnover ratio indicated that increased stock could not be used to increase the sale. Decline in account receivable turnover ratio brought the conclusion that debtors management of SAIL has weaken over the study period.

On the basis of findings, researcher also concluded that Market valuation of SAIL has decline over the period of study. Further, the financial performance measures used in the study, i.e. Return on capital employed, Economic Value Added and Market Value Added, have been in declining trend during study period which brought the conclusion that overall financial performance of SAIL was satisfactory during initial years of the study but deteriorated in subsequent years.

It is also concluded that global economic recession of 2008 has impacted financial performance of Indian steel industry including SAIL. Also the current problem of global surplus steel production capacity and slow demand growth have impacted steel industries of many countries by oversupply of steel in global market. Currently, Indian steel industry is facing challenge of cheap imports from China, Japan, South Korea & Russia. Because of these cheap imports, price of steel has declined and the domestic steel industry, with higher borrowing and raw material cost and lower productivity, is at a comparative disadvantage.

7.3 SUGGESTIONS

On the basis of the findings of study, following suggestions may be offered in order to improve financial performance of Steel Authority of India Limited.

7.3.1 Suggestions for improving the Liquidity position of SAIL.

1. Liquidity is an area which needs sincere attention in the case of SAIL. Current ratio of SAIL indicates poor liquidity position especially during last years of the study. Current ratio of SAIL was below the industry average and standard norm. It may be suggested that the company must reduce the amount of current liabilities and/or increase the amount of current assets up to a reasonable level.

2. The liquid assets of SAIL were insufficient. Liquid ratio of SAIL was below the industry average. The company must maintain adequate amount of liquid assets in order to meet short-term commitments and emergency requirements.

3. Liquidity management is an area which needs serious attention for the companies having negative net working capital. The management of SAIL should take every possible effort to resolve their present working capital crisis. The management should maintain a reasonable level of current assets and current liabilities to improve the overall liquidity position of the company. It can be done by reducing excessive burden of current liabilities and or by increasing the level of current assets depending upon the requirements.

7.3.2 Suggestions for improving the Leverage/solvency position of SAIL.

1. The debt-equity ratio of SAIL has been a little higher as compared to the standard norm and industry average during the study period. The Debt to equity position of the company has been satisfactory as this proportion is acceptable for a manufacturing company. It may be suggested that SAIL may maintain its capital structure but SAIL should avoid using more long term debt.

2. The Interest Coverage Ratio of the company was highly satisfactory during the initial years of the study but it declined during the last years of the study due to decline in the earning capacity of SAIL. Higher debt in capital structure and decline in profitability exposed the SAIL to higher financial risk. Therefore, it is suggested that SAIL should take caution in using long term debt fund and SAIL is advised to reduce debt burden in order to avoid financial distress.

7.3.3 Suggestions for improving the management efficiency of SAIL.

1. Profitability of any business depends on the effective utilization of its assets. SAIL need to maintain the assets turnover at a healthy level. TATR of SAIL has been lower than the industry average during study period. SAIL suffers from under-utilization of its assets. It may be due to shortage of working capital, shortage of raw material and other inputs, labour problem, product obsolescence, failure in marketing function, defective pricing policy etc. On the basis of findings related to *Asset management* of SAIL, the management of the company is advised to detect the reasons and make possible effort to solve them as far as practicable.

2. Inventory Turnover Ratio of SAIL have declined over the period of study indicating that SAIL has not been able to efficiently use the increase in inventory stock over the period of the study. On the basis of findings related to *Inventory management* of SAIL, it is suggested that the level of inventory should be fixed up scientifically in order to avoid the problem of under-stocking and over-stocking. Marketing functionary should be strengthened to improve the sales, demand should be forecasted scientifically, inventory for slow moving items should be reduced accordingly and inventory control techniques should be used to avoid over accumulation of inventory.

3. Account Receivable Turnover Ratio indicates the efficiency of credit collection and effective credit policy. Study revealed that debt management efficiency of SAIL has declined over the period of study. Therefore, receivable management of SAIL needs serious attention by the management. On the basis of findings related to *Debtors management* of SAIL, the management of SAIL is advised to review their credit and collection policy.

Further, it is suggested that management should reduce the credit period, should review the over dues periodically and should strengthen the debt collection efforts.

4. Study revealed that the operating expense ratio of SAIL increased over the period of study indicating decline in the operational efficiency of management and rise in the operational expenses over the period of study, particularly increase in raw material prices, power & fuel cost and higher provisions for pay hikes & revision in actuarial liability pertaining to gratuity and leave encashment benefits. It is advised that SAIL should reduce its operating expenses by focusing on cost management and improving operational efficiency.

5. It was found from the analysis that working capital turnover ratio of SAIL was exceptionally very high or negative during last years of study, indicating a very low maintenance of working capital or negative working capital in the last years of the study. Therefore, on the basis of findings related to *working capital management* of SAIL it is suggested that management should maintain a reasonable level of current assets and current liabilities and should utilize its working capital efficiently to generate the sale.

7.3.4 Suggestions for improving the profitability of SAIL

1. Gross profit ratio of SAIL has been in fluctuating trend during study period. In some years GPR decreased due to increase in cost of goods sold particularly increase in the prices of raw materials. Therefore, effective cost management is advised to improve profitability of SAIL.

2. The Operating profit margin & net profit margin of SAIL have been much lesser than gross profit margin indicating higher operating cost. SAIL is suggested to reduce operating expenses to improve the profitability.

3. Multiple regression analysis revealed that liquidity, solvency and management efficiency have significantly impacted profitability of SAIL. Therefore, SAIL

is suggested to improve in these areas as suggested above to improve profitability of business.

7.3.5 Suggestions for improving the market valuation of SAIL

1. Dividend payout ratio of SAIL declined over the period of study. Decline in dividends paid discourage the investors, and the stock price usually depreciates as investors seek other dividend-paying stocks. It is suggested that SAIL should maintain a stable dividend payout ratio to indicate a stable dividend policy in order to appreciate the stock prices and ultimately the market valuation of SAIL.

2. The Earning Per Share of SAIL has been higher during the initial years of the study but declined during subsequent years. It is an indication of low return per share of the company. A lower ratio is the indication of the lower capacity of the concern to pay dividend to its equity share holders, which in turn results in declining of market price of SAIL's share. Therefore, SAIL is suggested to increase its earnings to improve its market valuation.

3. Price Earnings Ratio shows investors expectation for future earnings. Higher P/E ratio indicates higher expectation of investors for future growth in earnings. P/E ratio of SAIL showed a mixed trend during study period, it declined during the last years of study indicating negative future expectation for earnings by the investors. Market to Book value Ratio of SAIL was less than one during last two years of study indicating market was willing to pay less than book value per share. SAIL is advised to improve its financial performance in order to improve its market valuation.

4. Market valuation of a company may be increased with the help of innovation. Innovation may be in the form of new product, development in existing product, new technology of production to reduce cost, new market to sell the product or new supplier of raw material for regular supply at reduced price. SAIL has Research & Development Centre for Iron & Steel (RDCIS) at Ranchi for development of improve processes and products. It is suggested

that SAIL should enhance its R&D activities and increase its R&D expenditure.

5. Capital structure of a company may impact its market valuation. SAIL is suggested to maintain typical debt to equity ratio for steel industry as investors may compare capital structure of SAIL with best practices in the industry.

6. Strong customer relationship helps the companies to protect existing market share and to expand it further. SAIL is advised to maintain strong customer relationship as a satisfied customer helps in gaining market share through words of mouth without any marketing expense.

7. SAIL is suggested to hire skilled and dedicated employees as it reduces turnover and training expenses.

7.3.6 Suggestions for improving the Economic Value added and Market Value added of SAIL

1. Economic Value added is correlated with the traditional performance measures and it is used as a measure of financial performance. It is clear from the result of multiple linear regression analysis that liquidity, solvency and management efficiency have significantly impacted Economic Value Added of SAIL. Therefore, SAIL is suggested to improve in these areas as suggested above to improve EVA of business.

2. Multiple regression analysis revealed that profitability, Economic Value Added and market valuations have significantly impacted Market Value Added of SAIL. Therefore, SAIL is suggested to improve in these areas as suggested above to improve profitability of business.

7.3.7 General Suggestions

1. Despite the global over capacity of steel production, domestic demand for steel will continue to grow. Therefore, efforts are needed from all stakeholders to make use of this demand side opportunity.

2. Imposing provisional safeguard duty, tariffs and minimum import price are not enough. Government of India should take more measures to stall cheap imports of steel.

3. Competitiveness is important for survival and success of steel companies. Therefore, Steel companies should themselves identify ways to adapt to the changing market conditions.

4. The Indian Government should provide an enabling environment for industry to meet the challenges of land acquisition, regulatory approvals and infrastructure access. Land acquisition is needed to be smooth, railways should be upgraded to deal with increased volumes and port efficiency & capacity should be enhanced.

5. Because of declining profitability and stressed balance sheets, availability of capital at reasonable costs is a challenge for steel companies in India. The Government should create a supportive environment for investors, lenders so that the steelmakers can raise the capital at reasonable costs.

6. Government should ensure availability of raw materials for steel industry at competitive price. This Required diversifying sources of raw material like joint ventures with global miners, vertical integration etc. Infrastructure should be improved to facilitate imports of raw materials. Further, to manage the volatility, financial derivatives market for steel and raw materials should be developed.

7. Government should take more steps to attract investment in sectors such as infrastructure & automobiles to increase steel consumption in the country.

8. Make in India campaign is expected to encourage steel consumption, now as steel industry is a capital intensive industry, Government of India should promotes investment to meet growing domestic demand.

9. Steel Industry should find ways to attract and retain talent, investment should be done in leadership and competency development and knowledge management should be strengthened to provide human capital to the sector.

7.4 SCOPE OF FURTHER RESEARCH

There is no such particular set of determinants that could influence financial performance of firms uniformly in any country, industry and institutional setup. Although, the present study has contributed significantly, there are various research issues, which have not been addressed in this study and need further investigation. In the present area of study, there is a scope for further research. The researcher suggests the following areas for further research:

1. The present study is restricted to Steel Authority of India Limited in steel industry alone. Hence, studies can be undertaken in other steel companies and a comparative study across companies can also be attempted.

2. For further studies, other financial performance measures can also be considered other than the measures considered in this study.

3. In this study, the impact of functional ratios were found on financial performance of SAIL, further studies may be undertaken to find impact of firm specific variables and macroeconomic variables on financial performance of firms.

4. Present study analyze financial performance of one public sector company in steel industry, further studies can be undertaken to compare financial performance of private and public sector enterprises in steel industry.

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Appendices

Table- 1a: Year wise World crude steel production (in million tonnes)

Year	Production	% Change
2005	1148	8.0
2006	1250	8.9
2007	1348	7.8
2008	1343	-0.4
2009	1238	-7.8
2010	1433	15.7
2011	1537	7.2
2012	1559	1.4
2013	1649	3.0
2014	1665	0.97

***Source**: World steel in figures (2015), World steel association*

Table- 1b: Major steel producing countries (in million tonnes)

Rank	Country	Production 2014	Production 2013	% Change	% share 2014
1	China	822.7	815.4	0.9	49.5
2	Japan	110.7	110.6	0.1	6.7
3	United states	88.3	86.9	1.7	5.3
4	India	83.2	81.3	2.3	5.0
5	South Korea	71.0	66.1	7.5	4.3
6	Russia	70.7	68.9	2.6	4.3
7	Germany	42.9	42.6	0.7	2.6
8	Turkey	34.0	34.7	-1.8	2.1
9	Brazil	33.9	34.2	-0.7	2.0
10	Ukraine	27.2	32.8	-17.1	1.6

***Source**: World steel in figures (2015), world steel association*

Table- 1c: Per Capita Steel Consumption of Steel (in Kg)

Country/Region	2014	2013	% change
World Average	216.6	217.8	-0.6
European Union	287.7	275.8	4.3
Taiwan	837.1	792.6	5.6
South Korea	1118.8	1050.7	6.5
China	510.0	530.6	-3.9
USA	331.4	299.0	10.8
Russia	302.8	306.4	-1.2
Canada	428.5	400.6	7.0
Japan	531.7	513.1	3.5
India	59.4	58.8	1.0

***Source:** World steel in figures (2015), world steel association*

Table 2a: Net-Operating Profit After Tax

Year	EBIT (Rs. Crores)	Effective Tax Rate (%)	NOPAT (Rs. Crores)
2005-06	6266.41	29.54	4415.3963
2006-07	9863.19	34.09	6501.1159
2007-08	11848.98	34.42	7770.1647
2008-09	9796.73	34.48	6418.4839
2009-10	10773.01	33.49	7164.6491
2010-11	7832.05	32.10	5317.6771
2011-12	6060.55	31.99	4122.0634
2012-13	4306.39	32.69	2898.5341
2013-14	4392.93	21.07	3467.2375
2014-15	3998.88	12.42	3502.3409

Source: *Calculated From Financial Reports of SAIL*

Table 2b: Capital Employed

Years	Total Assets	Non-Interest bearing current liabilities	Capital Employed	Average Capital employed
2005-06	29666.99	10849.15	18817.84	18160.48
2006-07	42285.69	11201.84	31083.85	24950.845
2007-08	55524.9	13499.71	42025.19	36554.52
2008-09	55895.67	17434.24	38461.43	40243.31
2009-10	70498.41	17685.98	52812.43	45636.93
2010-11	78097.15	14459.36	63637.79	58225.11
2011-12	78493.89	14407.01	64086.88	63862.335
2012-13	86504.32	15086.16	71418.16	67752.52
2013-14	93868.52	18045.27	75823.25	73620.705
2014-15	101318.89	20483.57	80835.32	78329.285

Source: *Calculated From Financial Reports of SAIL*

Table 2c: Weighted average of the interest rates on Central govt securities

Year	Interest rate (%)
2005-06	7.34
2006-07	7.89
2007-08	8.12
2008-09	7.69
2009-10	7.23
2010-11	7.92
2011-12	8.52
2012-13	8.36
2013-14	8.45
2014-15	8.43
Average	**7.95**

Source: *Reserve Bank of India*

Table 2d: Return on SENSEX (Market Return)

Year	Daily Return (%)	No. Of Working Days	Yearly Return (%)
2005-06	0.225	251	56.47
2006-07	0.074	249	18.52
2007-08	0.090	251	22.61
2008-09	-0.157	243	-38.15
2009-10	0.260	244	63.44
2010-11	0.047	254	11.94
2011-12	-0.036	249	-9.04
2012-13	0.035	249	8.69
2013-14	0.075	251	18.77
2014-15	0.095	243	23.13
Average	0.071	248	17.56

Source: *BSE*

Table 2e: Beta Value of SAIL

Year	Beta
2005-06	1.36
2006-07	1.44
2007-08	1.48
2008-09	1.17
2009-10	1.22
2010-11	1.18
2011-12	1.43
2012-13	1.34
2013-14	1.02
2014-15	1.37

Source: *Calculated from BSE data*

Table 2f: Cost of Equity of SAIL

Year	Cost of Equity (%)
2005-06	21.02
2006-07	21.81
2007-08	22.13
2008-09	19.15
2009-10	19.64
2010-11	19.31
2011-12	21.72
2012-13	20.85
2013-14	17.76
2014-15	21.12

Source: *Calculated*

Table 2g: Cost of Debt of SAIL

Year	Cost of Debt (%)
2005-06	4.83
2006-07	2.30
2007-08	1.05
2008-09	1.20
2009-10	2.17
2010-11	1.72
2011-12	2.12
2012-13	2.13
2013-14	2.68
2014-15	3.89

Source: *Calculated*

Table 2h: Weighted Average Cost of Capital (WACC)

Year	WACC (%)
2005-06	12.86
2006-07	13.20
2007-08	12.34
2008-09	12.31
2009-10	13.39
2010-11	11.84
2011-12	13.25
2012-13	12.61
2013-14	10.26
2014-15	11.81

Source: *Calculated*

Table 2i: Market Value of Equity

Year	Market Price Per Share (Rs.)	Number of Shares (in Crore)	Market Value of Equity (Rs Crore)
2005-06	83.3	413.04	6893.6376
2006-07	114.1	413.04	4076.7048
2007-08	184.75	413.04	6261.6864
2008-09	96.45	413.04	7595.8056
2009-10	251.8	413.04	6245.1648
2010-11	169.75	413.04	6852.3336
2011-12	94.05	413.53	5014.3056
2012-13	62.35	413.53	3597.711
2013-14	71.4	413.53	2332.3092
2014-15	67.4	413.53	2654.8626

Source: *Calculated*

Table 2j: Market Value Added of SAIL

(in Rs. Crore)

Year	Market Value Of Equity	Book Value of Equity	Market Value Added
2005-06	6893.6376	12707.68	21698.552
2006-07	4076.7048	17479.01	29648.854
2007-08	6261.6864	23287.96	53021.18
2008-09	7595.8056	28445.02	11392.688
2009-10	6245.1648	33743.46	70260.012
2010-11	6852.3336	37600.88	32512.66
2011-12	5014.3056	40275.53	-1383.0335
2012-13	3597.711	41641.39	-15857.7945
2013-14	2332.3092	43284.58	-13758.538
2014-15	2654.8626	44202.94	-16331.018

Source: *Calculated*

Fig. 3a

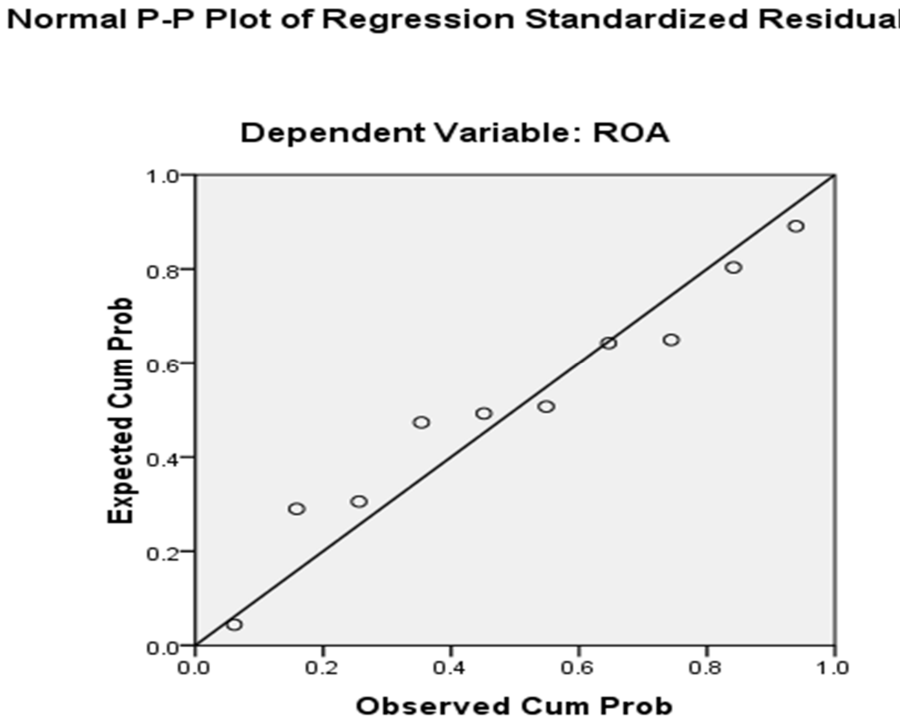
Normal P-P Plot of Regression Standardized Residual
Dependent Variable: ROA
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0

Fig. 3b

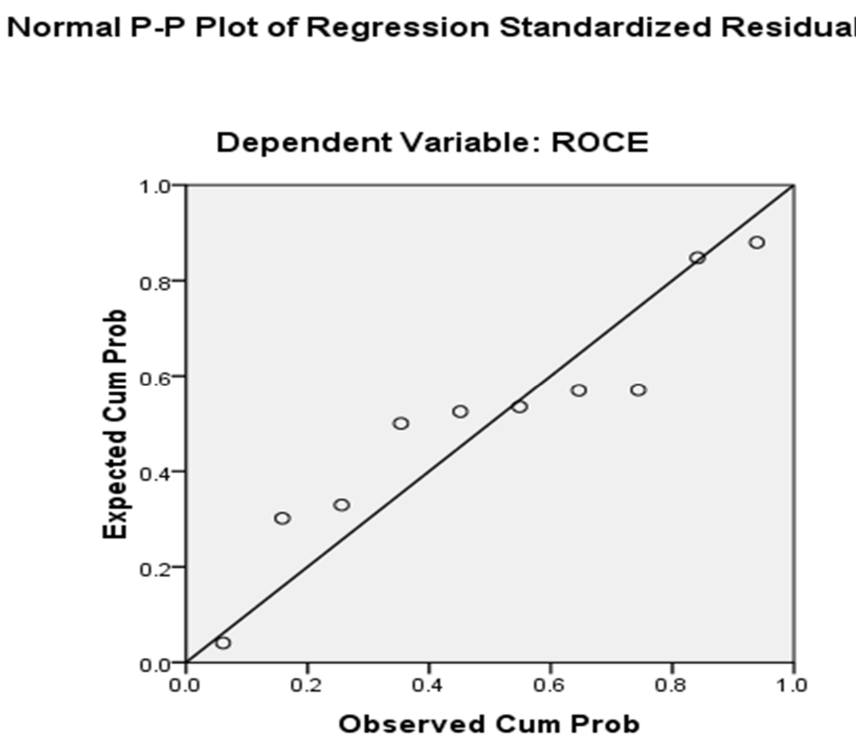
Normal P-P Plot of Regression Standardized Residual
Dependent Variable: ROCE
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0

Fig. 3c

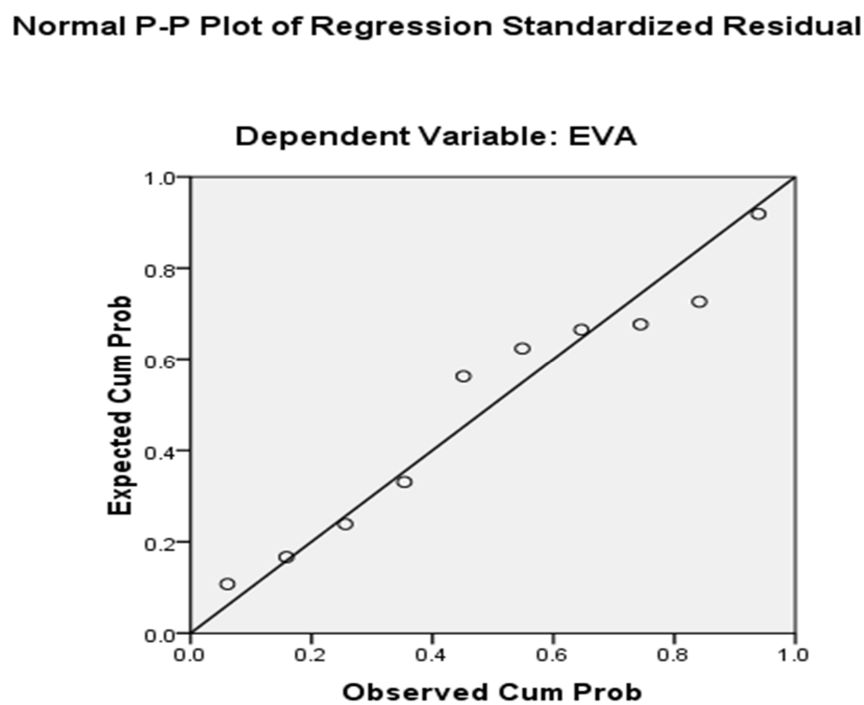
Normal P-P Plot of Regression Standardized Residual
Dependent Variable: EVA
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0

Fig. 3d

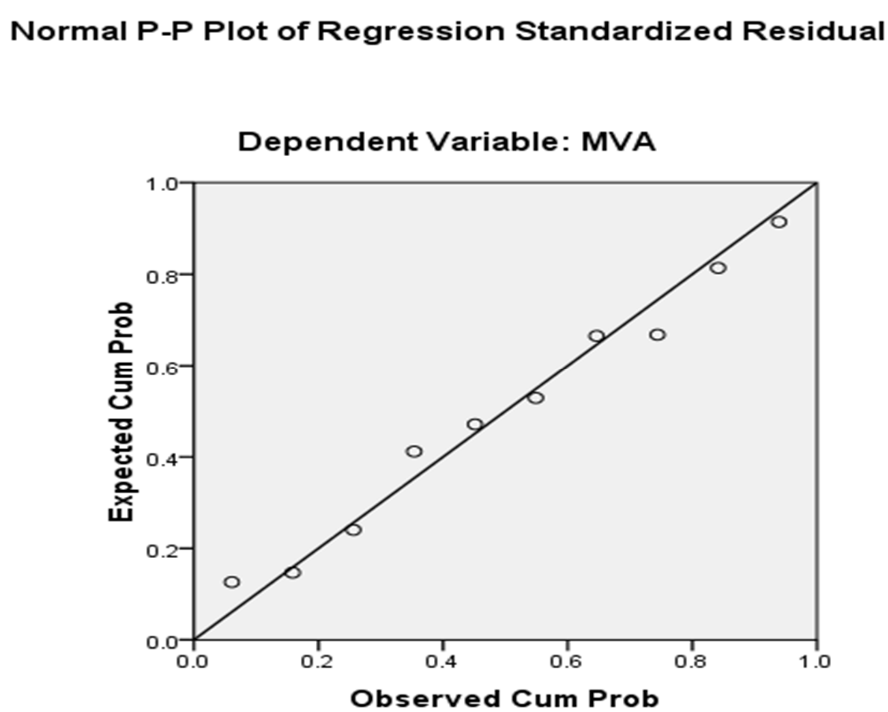
Normal P-P Plot of Regression Standardized Residual
Dependent Variable: MVA
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0

Table 4a: White Heteroskedasticity Test for OLS model 1

F-statistic	8.277735	Prob. F(3,6)	0.0149
Obs*R-squared	8.054046	Prob. Chi-Square(3)	0.0549
Scaled explained SS	3.514035	Prob. Chi-Square(3)	0.3189

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Included observations: 10

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.002800	0.001065	-2.629542	0.0391
CR^2	-0.000141	0.000270	-0.520106	0.6216
DER^2	0.001528	0.000796	1.920002	0.1033
ITR^2	9.09E-05	4.40E-05	2.066386	0.0843

R-squared	0.805405	Mean dependent var	0.000853
Adjusted R-squared	0.708107	S.D. dependent var	0.001400
S.E. of regression	0.000756	Akaike info criterion	-11.24748
Sum squared resid	3.43E-06	Schwarz criterion	-11.12645
Log likelihood	60.23742	Hannan-Quinn criter.	-11.38026
F-statistic	8.277735	Durbin-Watson stat	2.241028
Prob(F-statistic)	0.014893		

Source: E-Views output
Noted: CR= Current Ratio, DER = Debt to Equity Ratio, ITR = Inventory Turnover Ratio

Table 4b: White Heteroskedasticity Test for OLS model 2

F-statistic	6.978195	Prob. F(3,6)	0.0221
Obs*R-squared	7.772381	Prob. Chi-Square(3)	0.0510
Scaled explained SS	3.054440	Prob. Chi-Square(3)	0.3833

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Included observations: 10

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.000232	9.10E-05	-2.553215	0.0433
CR^2	-4.83E-06	2.31E-05	-0.209324	0.8411
DER^2	0.000135	6.80E-05	1.984519	0.0944
ITR^2	6.15E-06	3.76E-06	1.635154	0.1531

R-squared	0.777238	Mean dependent var	7.17E-05
Adjusted R-squared	0.665857	S.D. dependent var	0.000112

S.E. of regression	6.46E-05	Akaike info criterion	-16.16793
Sum squared resid	2.50E-08	Schwarz criterion	-16.04690
Log likelihood	84.83967	Hannan-Quinn criter.	-16.30071
F-statistic	6.978195	Durbin-Watson stat	1.800985
Prob(F-statistic)	0.022061		

Source: E-Views output
Noted: CR= Current Ratio, DER = Debt to Equity Ratio, ITR = Inventory Turnover Ratio

Table 4c: Heteroskedasticity Test for OLS model 3

F-statistic	0.470507	Prob. F(3,6)	0.7138
Obs*R-squared	1.904495	Prob. Chi-Square(3)	0.5925
Scaled explained SS	0.377000	Prob. Chi-Square(3)	0.9450

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Included observations: 10

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1162868.	834487.3	1.393512	0.2129
CR^2	-179970.4	211726.1	-0.850015	0.4279
DER^2	-237442.6	623670.1	-0.380718	0.7165
ITR^2	6825.420	34483.16	0.197935	0.8496

R-squared	0.190450	Mean dependent var	486432.1
Adjusted R-squared	-0.214326	S.D. dependent var	537706.7
S.E. of regression	592533.7	Akaike info criterion	29.71138
Sum squared resid	2.11E+12	Schwarz criterion	29.83241
Log likelihood	-144.5569	Hannan-Quinn criter.	29.57860
F-statistic	0.470507	Durbin-Watson stat	3.357379
Prob(F-statistic)	0.713829		

Source: E-Views output
Noted: CR= Current Ratio, DER = Debt to Equity Ratio, ITR = Inventory Turnover Ratio

Table 4d: White Heteroskedasticity Test for OLS model 4

F-statistic	5.896871	Prob. F(3,6)	0.0320
Obs*R-squared	7.467351	Prob. Chi-Square(3)	0.0584
Scaled explained SS	0.943638	Prob. Chi-Square(3)	0.8149

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Included observations: 10

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	15148418	21430093	0.706876	0.5062
EVA^2	0.103417	0.613155	0.168664	0.8716
ROCE^2	-3.74E+08	2.84E+08	-1.318386	0.2355
MBR^2	7834165.	2445176.	3.203927	0.0185

R-squared	0.746735	Mean dependent var	49925957
Adjusted R-squared	0.620103	S.D. dependent var	44094885
S.E. of regression	27178240	Akaike info criterion	37.36291
Sum squared resid	4.43E+15	Schwarz criterion	37.48394
Log likelihood	-182.8145	Hannan-Quinn criter.	37.23013
F-statistic	5.896871	Durbin-Watson stat	2.776395
Prob(F-statistic)	0.031969		

Source: E-Views
Noted: EVA = Economic Value Added, ROCE = Return on Capital Employed, MBR = Market to Book Value Ratio

Published Paper

A STUDY ON GROWTH AND DEVELOPMENT OF STEEL INDUSTRY IN INDIA

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Abstract

The Role of Iron and Steel Industry in India GDP is very important for the development of the country. Iron ore and steel industry is one of the basic industries of the country and plays an important role in strengthening the economy. Per capita consumption of steel is considers as an important indicator of socio-economic development of a country. Therefore, in the present study an attempt has been made to analyze the growth and development in Indian Steel industry. The study is descriptive in nature, data has been presented with the help of tables and graphs. Finally, it was concluded by the authors that steel industry playing an important role in the development of the economy and suggested that industry needed to be strengthen with better infrastructure with government investment as well as with private and foreign investment.

Key Words: Steel Industry, Production, Consumption, Import, Export.

Introduction

Steel is one of the world's most essential materials. It is basic to every aspect of our lives, from infrastructure and transport to the tinplated steel container that are used to preserves food.. Steel is crucial to the development of any modern economy and is backbone of human civilization. Steel is a cornerstone and key driver for the world's economy (Walters, October 2012).The level of per capita consumption of steel is used as an important index of the level of socio-economic development and living standards of the people in any country. All major industrial economies are characterized by the existence of a strong steel industry and the growth of many of these economies has been largely shaped by the strength of their steel industries in their initial stages of development (Barad, 2005).

Economic growth of India is depends upon the growth of the Indian steel industry. Steel is continues to be used in traditional sectors such as construction, housing and ground transportation, special steels are increasingly used in engineering industries such as power generation, petrochemicals and fertilisers.(report planning commission, 2009).

The history of steel-making in India can be traced back to 400 BC when the Indian archers, recruited by Greek emperors, used steel tipped arrows. Archaeological finds in Mesopotamia and Egypt made up of steel and are more than six thousand years old. The Iron Pillar near Qutab Minar in Delhi built between 350 and 380 A.D and the famous Sun Temple at Konark in Orissa, built around 1200 AD, are the structures in India where steel was used (Sunitghosh).

Review of Literature

Yadav (2015) appraised and the performance of Iron and steel industry in terms of production, consumption and foreign trade and found that the industry had grown in manifold. In another study **Pal (2013),** examine the performance of Steel Industry in India and conclude that India had all potential to become top producer of steel in near future. **Burange & Yamini (2010)** analyzed the performance of selected firms in Indian Iron and steel industry in pre & post liberalization periods and found that the industry was mostly dominated by Tisco while SAIL had a greater market share.

Objectives of the study

- To measure the performance of steel industry of India in terms of production, consumption and foreign trade.
- To study the prospect of the Indian steel industry in terms of production and consumption.
- To study Indian Steel Industry in Global Perspective.

Research Methodology

The present study is descriptive in nature based on secondary data that has been collected from various annual reports, Ministry of Steel (Government of India), Steel Statistical year book, World steel Association and Economic Research Unit. The study has been conducted for a period of ten years ranging from 2004-05 to 2013-14. The data were described and analyzed with the help of tables followed by the interpretation.

Crude Steel Production and Consumption in India

Steel Production in India

Traditionally, producer of steel in India are mainly divide into three categories, Main Producers, Major Producers and Other Producers

Table – 1

Total production of steel (alloy and non-alloy) in million tonnes

Year	Main producer	Secondary producer	Less IPT/Own Consumption	Total (Finished Steel)	% Share of Secondary Producers
2003-04	15.383	27.966	2.640	40.709	60.8
2004-05	15.824	31.041	3.352	43.513	71.3
2005-06	16.413	34.809	4.656	46.566	74.8
2006-07	17.614	40.047	5.132	52.529	76.2
2007-08	18.020	43.332	5.277	56.075	77.3
2008-09	17.216	46.229	6.281	57.164	80.9
2009-10	18.038	51.093	8.507	60.624	84.3
2010-11	18.407	57.890	7.676	68.621	84.4
2011-12	17.978	66.426	8.708	75.696	87.8
2012-13	19.244	70.376	7.940	81.680	86.2

2013-14*	21.099	72.442	8.487	85.054	85.2

*Provisional, Source: Various annual reports, Ministry of Steel, GOI

Table - 3.7 showing production of finished steel for sale in India. Production for sale of total finished steel (alloy + non alloy) was 85.054 MT (provisional) in 2013-14 as compared to 81.68 MT in 2012-13. The share of secondary producers, which includes major and other producers, was 85.2 percent in 2013-14. This high share of secondary producer in total finished steel production for sale was mainly due to availability of raw materials like sponge as well as due to the expansion of capacities and emergence of new units in these segments.Production of finished steel for sale has been continuously increasing in India; in 2003-04 its production was 40.709 MT with 60.8 percent share of secondary producer in total finished steel production. In the year 2004-05 production increased to 43.513 MT, in 2005-06 it became 46.566 MT, in 2006-07 total finished steel production reached 52.529 MT and in 2007-08 it increased to 56.075 MT. Further, production of finished steel for sale increased, in 2008-09 production was 57.164 MT and in 2009-10 production was 60.624 MT. In 2010-11 Total finished steel production for sale was 68.621 MT and in 2011-12 it was 75.696 MT.

Table – 2

Trend in Crude Steel Production in Public and Private Sector in India (in million tonnes)

Year	Public sector	Private sector	Total production	Share of public sector
2003-04	15.788	22.939	38.727	41 %
2004-05	15.912	27.525	43.437	36 %
2005-06	16.964	29.496	46.46	36 %
2006-07	17.003	33.814	50.817	33 %
2007-08	17.09	36.77	53.86	32 %
2008-09	16.37	42.07	58.44	28 %
2009-10	16.71	49.13	65.84	25 %
2010-11	16.99	53.68	70.67	24 %
2011-12	16.48	57.81	74.29	22 %
2012-13	16.48	61.94	78.42	21 %
2013-14*	16.78	64.76	81.54	21%

*Source: Annual Reports Ministry of steel GOI, *provisional*

The table 3.8 highlights the total production of crude steel in India by the private and public sector. It is observed from the table that in public sector, the production of crude steel in India increased from 15.788 MT in 2003-04 to 17.09 MT in 2007-08, but the production decreased to 16.37 MT in 2008-09. The production of crude steel by public sector, again increased in 2009-10 to 16.71 MT and in 2010-11 to 16.99 MT, but the production again declined in 2011-12 to become 16.48 MT. The above table depicts a continuous decrease in share of crude steel production by public sector during last decade. Public sector produced 15.788 MT of crude steel with market share of 41 percent in 2003-04 and the production of crude steel by public sector increased to 16.78 MT in 2013-14, an increase of 1.0 MT, but the share of public sector in total production of crude steel reduced to 21 percent in 2013-14. The private sector produced 22.939 MT of finished steel, with market share of 59 percent in 2003-04. The production of steel by private sector during 2013-14 was 64.76 MT, 79percent of the total production. The private sector of steel industry is currently playing an important role in production and growth of steel industry in India. It can be concluded that the trend percentage of public sector is in declining stage when compared to private sector.

Steel consumption in India

Real Consumption of steel is obtained from apparent consumption (i.e production + imports – exports +/- variation in stocks) of total finished steel after adjusting for double counting in flat products (Ministry of steel, GOI). The year-wise trend in real consumption of total finished steel is shown below.

Table – 3

Apparent Consumption of Finished Steel (In Million Tonnes)

Year	Production for sale	Import	Export	Apparent consumption	Growth rate
2004-05	38.99	2.29	4.7	36.38	9.84
2005-06	42.16	4.31	4.81	41.43	13.88
2006-07	49.58	4.93	5.24	46.78	12.91
2007-08	56.08	7.03	5.08	52.12	11.42
2008-09	57.16	5.84	4.44	52.35	0.44
2009-10	60.62	7.38	3.25	59.34	13.35
2010-11	68.62	6.66	3.64	66.42	11.93
2011-12	75.69	6.86	4.59	71.02	6.92
2012-13	81.68	7.93	5.37	73.48	3.46
2013-14*	85.05	5.45	5.59	73.89	0.55

*Source: various Annual reports ministry of steel GOI, *provisional*

The apparent consumption of finished steel is given in table 2.7.Apparent consumption of steel in India showed an increasing trend in last decade. Domestic Real consumption of steel was 36.38 MT in 2004-05. Domestic real steel consumption grew 13.88 percent in the year 2005-06 to become 41.43 MT. In 2006-07 it further grew 12.91 percent and the real consumption of steel reached the level of 46.78 MT. In 2007-08, real steel consumption was 52.12 MT, an increase of 11.42 percent on previous fiscal year. In 2008-09, domestic real consumption grew just by 0.44 percent to become 52.35 MT. The low growth rate in 2008-09 was due to world economic crises that started in October 2008.With the recovery from the crises domestic steel consumption grew 13.35 percent in 2009-10 and reached the level of 59.34 MT. Further, it grew 11.93 percent in 2010-11 to become 66.42 MT. Domestic real steel consumption’s growth started to decline in 2011-12 and India's steel consumption grew by just 0.6% in 2013-14 fiscal, lowest in five years, to 73.89 MT. The growth in real steel consumption was mainly impacted by a slower expansion of the domestic economy and lower imports.

Table – 4

Per capita consumption of apparent steel in India (in kg)

Year	India	World average
2005	35.0	174.0
2006	39.4	188.5
2007	43.9	199.3
2008	43.2	197.2
2009	47.9	182.3
2010	53.0	206.4
2011	56.2	219.9
2012	56.9	221.9
2013	57.8	225.2

Source: Steel Statistical year book, World steel Association

Table 3.8 demonstrates per capita steel consumption in India. India's per capita consumption of steel has gone up by around 65 per cent in the last nine years to 57.8 kg in 2013 against 35.0 kg in 2005.India’s per capita consumption of finished steel stood at 35 kg in the year 2005, which was low when compared to the world average per capita consumption of finished steel of 174 kg in 2005. In 2006 it increased to become 39.4 kg as against world average of 188.5 kg. in 2007 per capita consumption of steel in India was 43.9 kg while world average steel consumption was at 199.3 kg. In 2008, per capita steel consumption decreased to 43.2 kg and so as the world average steel consumption to become 197.2 kg. This decrease was due to global economic crises which started in October 2008. In 2009, domestic per capita steel consumption increased to become 47.9 kg but world average showed further decreased to become 182.3 kg. In 2010, per capita steel consumption reached the level of 53.0 kg against 206.4 kg of world average consumption. It further grew to 56.2 kg in 2011 and 56.9 kg in 2012 against world average steel consumption of 219.9 kg in 2011 and 221.9 kg in 2012. In 2013 domestic per capita steel consumption stood at 57.8 kg while the world average was at 225.2 kg. Low per capita consumption of steel in India is related to low per capita income level, large size of the population and less development of infrastructure.

Export and Import of steel from India (in million tonnes)

Iron and steel products are importable freely as per the extant policy. Advance licensing scheme allow duty free import of raw material for export. Iron and steel are freely exportable. Duty entitlement pass book scheme was introduced to facilitate exports. Under this scheme exports based on notified entitlement rate, are granted due credit which would entitle them to import duty free good. The benefit on export of various categories of steel items scheme is currently applicable for steel exports.

Steel imports have increased in India due to deregulation and reduction in import duties on steel imports, surge in domestic demand and reduction in price differential between imported steel and domestic steel. Import volumes have been fluctuating during the last decades. Liberalization and free trade policy helped growth of steel exports from India. Steel exports from India declined during 2008 and 2011 due to decrease in demand of steel globally.

Table – 5

Export and Import of steel from India (in million tonnes)

Year	Import	% Growth	Export	% Growth	Net
2004-2005	2.29		4.70		Export
2005-2006	4.31	88.2	4.81	2.3	Export
2006-2007	4.93	14.4	5.24	8.9	Export
2007-2008	7.03	42.6	5.08	-3.1	Import
2008-2009	5.84	-16.9	4.44	-12.6	Import
2009-2010	7.38	26.4	3.25	-26.8	Import
2010-2011	6.66	-9.7	3.64	12.0	Import
2011-2012	6.86	3.0	4.59	26.1	Import
2012-2013	7.93	15.6	5.37	17.0	Import
2013-2014*	5.45	-31.2	5.59	4.1	Export

*Source: Various Annual Reports, Ministry of Steel, GOI, *Provisional*

Table 3.12 explains imports and exports of steel in India. In 2004-05, India's total imports were 2.29 MT while the figure for exports was 4.70 MT and therefore India was a net exporter of steel in 2004-05. In 2005-06, imports increased by 88.2 percent to become 4.31 MT and exports increased by 2.3 percent to become 4.81 MT, but still India was a net exporter of steel in 2005-

06 as the exports were more than the imports. In 2006-07, again steel exports were more than its imports. Total imports increased to 4.93 MT while total exports increased to 5.24 MT in 2006-07. India had been a net steel importer since 2007-08. India's exports were more than its imports. In 2007-08 India's steel imports stood at 7.03 MT, an increase of 42.6 percent as compared to 2006-07 while exports stood at 5.08 MT, a decrease of 3.1 percent on 2006-07. In 2008-09, a decline of 16.9 percent and 12.6 percent were recorded in steel imports and exports respectively. In 2009-10, India's steel imports increased to 7.38 MT but exports decline to 3.25 MT. In 2010-11, total steel imports were 6.66 MT, a decline of 9.7 percent on previous fiscal while the exports stood at 3.64 MT. In 2011-12, steel imports in the country became 6.86 MT and exports became 4.59 MT. In 2012-13, steel imports in India became 7.93 MT and its export stood at 5.37 MT. India became net steel exporter in 2013-14 after a period of six years. Total steel exports by India during fiscal 2013-14 stood at 5.59 MT as against imports of 5.44 MT. About 4.1 percent higher exports and 31.3 percent decline in imports helped India to become net exporter of steel. Higher exports were driven by mismatched demand supply situation in the country and imports were lower mainly due to slowdown in the domestic economy.

Forecasting Steel Demand and Supply in India

There are many studies projecting steel demand growth scenario over the next couple of decades. In a recent study, the Boston Consulting Group (BCG) has made the following observations. :

1. On the present pattern of growth - the real GDP of India grew from 2002 to 2013 was at 7.4per cent and the steel consumption grew by 8.2 percent in the said period. Over the next 12 years at a GDP growth of 6 – 6.5per cent, and a GDP elasticity of steel demand at 1.1, the likely growth of steel consumption growth rate was estimated at 7.3 percent per year and the finished steel consumption in 2025-26, on this basis, was estimated to grow to 155 – 170 million tonnes by that year.

2. Bench marking India's stage of economic growth with other countries – On another model, following established trajectory of growth as seen in other countries, the per capita consumption of steel in India would move from the level of 59 kgs in 2011 to 175 kgs in 2025-26, and given the fact that the population of India is projected to grow to 1.43 billion that year, the steel consumption in 2025-26 is likely to be around 250 million tonnes.

3. The goal of India to increase share of manufacturing to 25per cent of GDP by 2025 – The above target if achieved can propel the usage of finished steel from 16 kgs / $ PPP in the year 2012 to 22 – 25 kgs / $ PPP in the year 2025-25. This would mean a growth in steel consumption of 9 -10per cent and the steel consumption in 2025-26 is likely to be around 230 – 255 million tonnes.

Steel demand in India has been forecast mainly on the basis of past trends, taking into account the relationship between GDP and steel consumption, and then projecting specific assumed GDP growth rate for future years. The forecasts of steel demand for 2025-26 made by INSDAG as per standard methodology assuming 6 and 6.5per cent annual compounded average growth rate of the GDP seems fairly realistic. As per this, demand for finished steel is likely to rise to 165-171 million tonnes respectively. To meet this demand only, the country will require about 190-205 million tonnes of crude steel capacity to be set up. The estimates made by the ERU also are in the same order and the requirement of crude steel production to meet this demand is as below. The ERU, however, considers different growth rate assumptions in respect of the GDP at 6.5per cent and 7 per cent respectively (**Table-7,8**). In order to see the potential surge in the economy with the economy maintaining an annual average rate of growth of 8per cent, another scenario has been drawn up, which has also been included in the Tables mentioned.

Table- 6

Forecast of Finished Steel Demand (million tonnes)

	2013-14	2025-26	2032-33
Finished Steel Demand @ 6.5per cent GDP Growth Rate	74	176	273
Finished Steel Demand @ 7per cent GDP Growth Rate	74	186	298
Finished Steel Demand @ 8per cent GDP Growth Rate	74	208	339

Source: Economic Research Unit

Table- 7

Forecast of Crude Steel Production Derived from Forecast of Finished Steel Demand (million tonnes)

	2013-14	2025-26	2032-33
Crude Steel production @ 6.5per cent GDP Growth Rate	81	185	287
Crude Steel Production @ 7per cent GDP Growth Rate	81	196	314
Crude Steel Production @ 8per cent GDP Growth Rate	81	219	357

Source: Economic Research Unit

Indian steel industry in global perspective

Rapid rise in production has resulted in India becoming the 3 rd largest producer of crude steel in 2015 and the country continues to be the largest producer of sponge iron or DRI in the world. In 2014, the world crude steel production reached 1665 million tonnes (mt) and showed a growth of 1% over 2013. China remained the world's largest crude steel producer in 2014 (823 mt) followed by Japan (110.7 mt), the USA (88.2 mt) and India (86.5 mt) at the 4 th position.

Table- 8

Major steel producing countries (Production in million tonnes)

Rank	**Country**	**Production 2013**	**Production 2012**	**% Change**	**% share 2013**
1	China	779.0	731.0	6.6	48.5
2	Japan	110.6	107.2	3.2	6.9
3	United states	86.9	88.7	-2.0	5.4
4	India	81.2	77.3	5.0	5.0
5	Russia	68.7	70.4	-2.4	4.3
6	South korea	66.1	69.1	-4.3	4.1
7	Germany	42.6	42.7	-0.2	2.7
8	Turkey	34.7	35.9	-3.3	2.2

9	Brazil	34.2	34.5	-0.9	2.1
10	Ukraine	32.8	33.0	-0.6	2.0
11	Italy	24.1	27.3	-1.2	1.5
12	Taiwan	22.3	20.7	7.7	1.4
13	Mexico	18.2	18.1	0.5	1.1
14	France	15.7	15.6	0.6	1.0
15	Iran	15.4	14.5	6.2	1.0

Source: world steel in figures (2014), world steel association

The production of crude steel by major countries is given in table 3.2. The countries like China, Japan, India and South Korea are in the top in steel production in Asian countries.Much of Asia increased output, and apart from China it can also be seen that Taiwan was up 7.7%, India was up 5% and Japan increased by 3.2% with South Korea the only major Asian producing country to show a decline, down by 4.3%. Other notable increases were Iran, up 7%, France up 0.6 percent and Mexico, up 0.5%.In 2013, China accounts for nearly half of total production i.e. 779 milliontonnes, Japan accounts for 6.9% i.e. 110.6 Mt, India accounts for 81.2 Mt and South Korea is accounted for 66.1 Mt, which all totally becomes nearly one-third of global production. US produced 86.9 Mt of crude steel, 2.0 percent lower than that of 2012. Russia produced 68.7 Mt of crude steel in 2013, a 2.4 percent decrease on 2009 and Ukraine recorded a decrease of 0.9 per cent with a year-ended figure of 32.8 Mt. Germany showed a negative growth of 0.2 percent with production of 42.6 Mt of crude steel in 2013 while Turkey showed a negative growth of 3.3 percent with 34.7 Mt crude steel production. Brazil recorded a decrease of 0.9 percent with 34.2 Mt crude steel production in 2013. Crude steel production of Italy decreased by 1.2 percent and accounted for 24.1 Mt of crude steel production in 2013.

Table- 9

Per Capita Steel Consumption of Steel (in Kg)

Country/Region	2012	2013	% change
World Average	219.5	225.2	2.6
European Union	275.4	274.2	0.4
Taiwan	763.2	793.4	4.0
South Korea	1112.8	1057.4	-5.0

China	487.6	515.1	5.6
USA	304.6	300.2	-1.4
Russia	296.5	301.9	1.8
Canada	449.2	425.0	-5.4
Japan	505.7	516.4	2.1
India	57.5	57.8	0.6

Source: World steel in figures, 2014

According to World steel Association, Global per capita steel consumption was 225.2 kg in 2013 while in 2012 global per capita steel consumption was 219.5 kg, which showed an increase of 2.6 percent. Among larger economies, China's per capita steel consumption was 515.1 kg as compared to 487.6 kg in 2012 while EU showed an increase of 0.4 percent in per capita steel consumption in 2013 when compared to 2012. Per capita steel consumption of Taiwan was 793.4 kg in 2013, an increase of 4.0 percent when compared to 2012. South Korea, although showed a 5.0 percent decrease in per capita steel consumption, but still remain at top in per capita steel consumption. South Korea consuming more than double of that of China's per capita consumption. USA showed a decrease in per capita steel consumption by 1.4 percent in 2013 while Canada showed a decrease of 5.4 percent consuming 425 kg of steel per capita. Per capita steel consumption of Russia was 301.9 kg, increased by 1.8 percent in 2013 as compared to 2012 while Japan's per capita steel consumption was 516.4 kg in 2013. India's per capita steel consumption was 57.8 kg in 2013, a growth of 300 gm. India's steel consumption grew by just 0.6 percent as compared to 2012, mainly impacted by slow growth in domestic economy and lower imports.

FINDINGS

1. Production of finished steel has risen over the period of study.

2. However, the share of public sector enterprises in production of finished steel has declined over the period of study.

3. Installed capacity of plants has increased but the capacity utilization of that installed capacity has declined.

4. Apparent consumption of steel has risen during the study period but the growth rate of consumption has declined in the last years of the study.

5. Per capita consumption of steel increasing constantly but still there is a huge gap between India and world average per capita steel consumption.

6. India has been net importer of steel during the initial years of the study and net exporter of steel in later years, however India was a net importer of steel in the last year of the study

7. India continues to remain at Fourth position in the production of crude steel in the world in 2014. China continues to remain at first position with Japan and U.S at second and third respectively.

8. Per capital consumption of steel in India showed a Positive growth in 2013 as compared to 2012. However the growth rate was very low.

Conclusion

In recent time steel industry is one of the fastest growing industry in India and as well as in the world. The purpose of the study is to evaluate the actual condition and trend of steel industry in India. Result of the study found that India has all potential to become top producer of steel in near future. The steady growth of production and consumption indicates that India has set a higher growth path by the end of the decade. The Growth rate of production, consumption and foreign trade shows an impressive picture of the development of the industry for the study period.

Steel Industry is very much strategic for the development of an economy. Crude steel production in India has risen during the last decades but still there is a need to further hastened the production of crude steel in the country to cope with the demand of steel in the future. Public sector enterprises should increase their role in the production of steel. Installed capacity should be increased and companies should utilize that increased capacity. Industry required infrastructural development with the help of government as well as private and foreign direct investment.

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